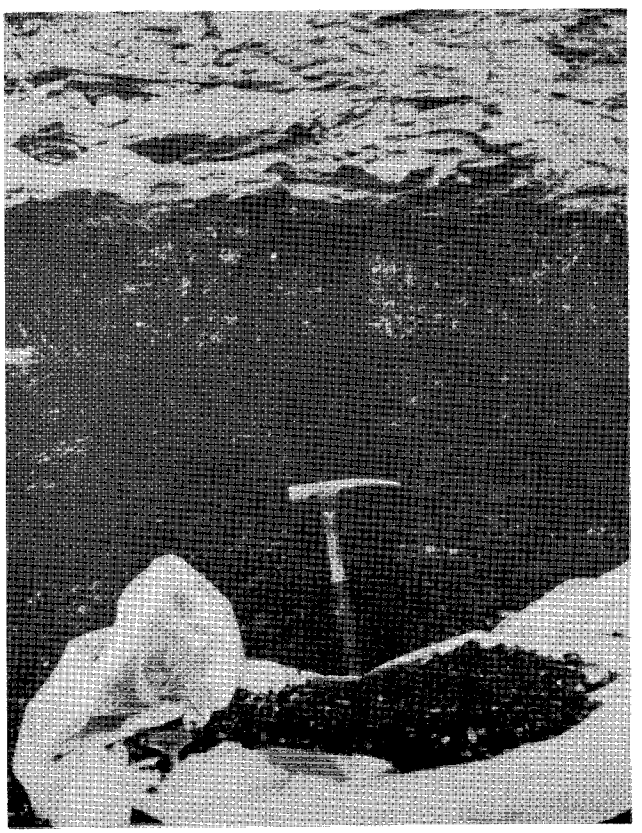
VIRGINIA DIVISION OF MINERAL RESOURCES PUBLICATION 63

ANALYSES OF VIRGINIA COAL SAMPLES COLLECTED 1978-1980

James A. Henderson, Jr., G. P. Wilkes, Linda J. Bragg, and Charles L. Oman



COMMONWEALTH OF VIRGINIA

DEPARTMENT OF MINES, MINERALS AND ENERGY
DIVISION OF MINERAL RESOURCES
Robert C. Milici, Commissioner of Mineral Resources and State Geologist

CHARLOTTESVILLE, VIRGINIA
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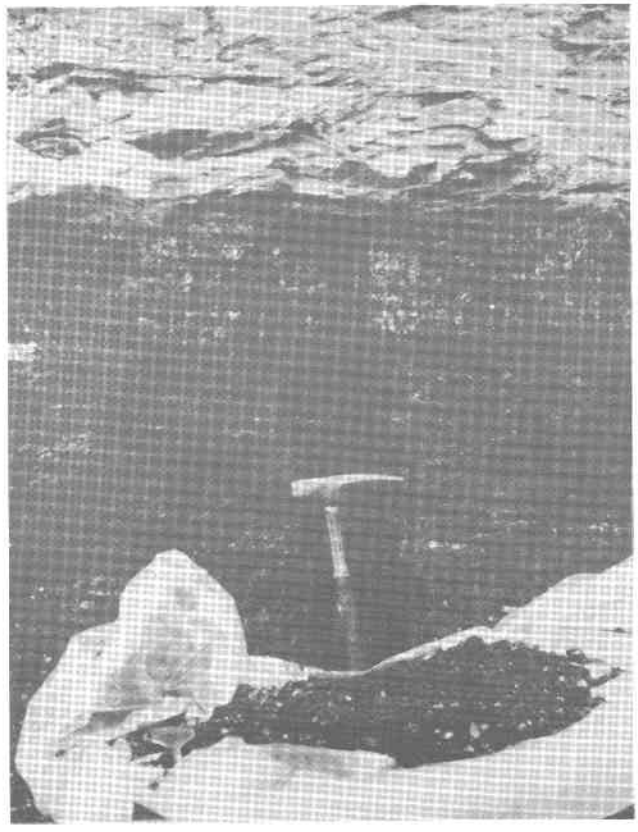

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FRONT COVER: Channel sample in a 2.5-foot-thick coal bed in Russell County.

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DEPARTMENT OF MINES,
MINERALS AND ENERGY

Richmond, Virginia

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF PURCHASE AND SUPPLY
RICHMOND

1985

Publication available from Virginia Division of Mineral Resources, Box 3667, Charlottesville, VA 22903.

Portions of this publication may be quoted if credit is given to the Virginia Division of Mineral Resources.
It is recommended that reference to this report be made in the following form:
Henderson, J.A., Jr., Wilkes, G.P., Bragg, L.J., and Oman, C.L., 1985, Analyses of Virginia coal samples collected 1978-1980: Virginia Division of Mineral Resources Publication 63, 56 p.

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ANALYSES OF VIRGINIA COAL SAMPLES COLLECTED IN 1978-1980

James A. Henderson, Jr.[1], Gerald P. Wilkes[2], Linda J. Bragg[3], and Charles L. Oman[3]

ABSTRACT

Since 1975 the Virginia Division of Mineral Resources has been collecting coal samples from fresh coal exposures in Virginia. Results from the analyses of 83 samples collected during 1978-1980 are included in this report. The analyses of these samples were performed in cooperation with the U. S. Geological Survey and the results entered into the National Coal Resources Data System (NCRDS).

Chemical analyses were made by the U. S. Geological Survey, the U. S. Department of Energy, and the Geochemical Testing, Inc. These analyses are made to report proximate and ultimate analyses, forms of sulfur, heat values, fusibility of ash, free-swelling index, and major-, minor-, and trace-element concentrations. A statistical summary is included for the samples described in this report.

INTRODUCTION

Coal has been mined in Virginia since colonial times. Initial production in the State was in the Richmond basin (Figure 1) where coals of Triassic age were mined until the early part of the 20th century. Coals of Mississippian age were mined in the Valley coal fields beginning in the middle 1800's and activity continued until 1971. Mining of Pennsylvanian-age coals in the Southwest Virginia Coal Field began in the 1890's. The Southwest Virginia Coal Field covers part or all of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise counties.

Information on proximate and ultimate analyses, heat values, and forms of sulfur for some Virginia coals is available in reports published by the U. S. Bureau of Mines (U.S. Bureau of Mines, 1926; Eby and Campbell, 1944). Preparation characteristics for Virginia coals have also been published by the U.S. Bureau of Mines (Gray and Boley, 1958a, 1958b; Deurbrouck, 1963a, 1963b). Several reports are available on the chemical composition of coal ash (Abernethy, Peterson and Gibson, 1969a, 1969b). More recently, U. S. Geological Survey open-file reports contain data on proximate and ultimate analyses, forms of sulfur, heat values, major-, minor-, and trace- element concentrations (Swanson and others, 1976; Zubovic and others, 1979, 1980; Simon and Englund, 1983a, 1983b).

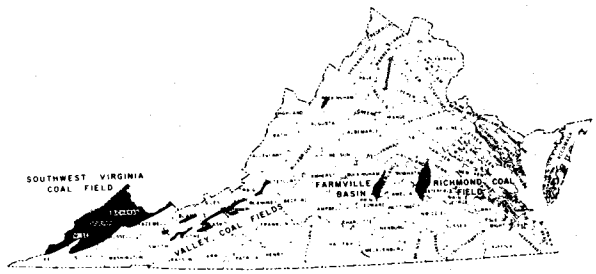

Figure 1. Locations of coal fields in Virginia.

The Division of Mineral Resources has been collecting coal samples for analyses in cooperation with the U. S. Geological Survey since 1975. This report contains the analytical results for 83 coal samples collected in 1978, 1979, and 1980. These samples are from many of the major coal beds in the Southwest Virginia Coal Field that were being mined during the time of the study. Data presented in this report and those by Swanson, and others (1976), Zubovic and others (1979 and 1980) and Henderson, Oman and Coleman (1981) are the latest and most detailed available for Virginia coals.

ACKNOWLEDGMENTS

The authors wish to thank members of the staff of the Division of Mineral Resources for help in the collection of samples, especially J. J. Arnold, W. W. Whitlock, and J. W. Webb. Continued assistance was received from personnel of the U. S. Geological Survey in Reston, Virginia, especially, M. Deverux Carter, Kathy Krohn, A. L. Medlin, Jack H. Medlin, and Peter Zubovic. Acknowledgement is also given to the analytical staffs of the U. S. Department of Energy, Geochemical Testing, Inc., and the U. S. Geological Survey for the analyses. The Division of Mineral Resources also thanks the many coal companies who assisted the sampling program by allowing the Division access to their mines.

[1] Virginia Division of Mines, Oil and Gas Section, Abingdon, Virginia
[2] Virginia Division of Mineral Resources, Charlottesville, Virginia
[3] U. S. Geological Survey, Reston, Virginia

SAMPLED AREA

The Southwest Virginia Coal Field is in the Appalachian Plateaus province. Most of the coal occurs in the rocks of the Cumberland thrust sheet. The coal and associated rocks in the Southwest Virginia Coal Field are generally flat-lying to gently dipping, except along the southeastern boundary of the Appalachian Plateaus province (which is an area of imbricated thrust sheets) and the northwestern edge of the Cumberland thrust sheet (which is bounded by the Pine Mountain fault). Other major structural features include the Russell Fork fault (a northwest-trending strike-slip fault), the Powell Valley anticline, and the Middlesboro syncline (Miller 1974, Figure 11). The coal beds occur in strata composed principally of sandstone and siltstone that in a few places contain thin clastic and calcareous beds of marine origin. Geologic maps and reports on the coal-bearing counties in southwest Virginia are listed in the bibliography.

Samples described in this publication were collected from three of the seven counties in the Southwest Field (Table 1; Figures 3a-3c). These samples include two from Buchanan County, forty-four from Dickenson County, and thirty-seven from Wise County. Forty-eight of the samples are from the Wise Formation and 35 are from the Norton Formation. The oldest coal sampled for this report is the Tiller coal bed from the Norton Formation in Dickenson County. The youngest coal sampled is the Morris coal bed from the Wise Formation in Wise County.

SAMPLING PROCEDURES

All but one of the samples presented in this report are face-channel samples and were collected using procedures similar to those described by Schopf (1960), Glass (1975), Swanson and Huffman (1976), Boreck, et.al. (1977) and Henderson, et.al. (1981). One run-of-mine sample was taken from an underground mine in the Lower Banner coal bed in Dickenson County. Sampling sites were selected to give wide geographic and stratigraphic distribution. Coal freshness, geographic proximity to other sample sites, and the safety of the sampling area were used in deciding whether to accept or reject a potential sampling site. The channel samples represent the entire thickness of coal and interbedded material being mined at each locality. Non-coal partings that are mined with the coal were included in the sample. In places where partings were excluded from mining, separate supplemental samples of the partings were taken; these samples were not analyzed but are stored at the Division of Mineral Resources coal repository. Where the coal was being mined in benches, separate samples were taken from each coal interval. At sites where the coal thickness was greater than about 6 feet, two samples were taken. In such cases, separate samples were collected on either side of major partings or textural breaks in the coal.

A complete description of the coal and associated roof and floor rocks was made at each sampling site. Coal descriptions based on field observations included thickness of the coal, thicknesses of subunits, accessory minerals, amount and type of observable materials, cleat formation, and primary and secondary structures. Sampling site descriptions included site location, elevation of the coal bed, lithologies of rocks above and below the coal bed, and strike and dip of the coal-bearing units. In many cases supplemental samples were taken of the roof- and floor-rock and stored in the Division of Mineral Resources coal repository in Charlottesville.

Channel samples of the coal were obtained using chisels and a hammer. Width and depth of the channels varies with the thickness of the coal but were sufficient to give a sample weight of approximately 20-25 pounds. Coal chipped from the channel fell onto a new sheet of polyethylene, about four feet square. After crushing with a hammer to less than ¾ inch size, the sample was thoroughly mixed by hand and then shaped into a cone. The cone was then quartered and one quarter placed in a U. S. Department of Energy coal container. This sample was sent to the U. S. Geological Survey for forwarding to the U. S. Department of Energy or the Geochemical Testing Inc. laboratory. Each of the other three quarters were placed in double bagged polyethylene sacks and sealed. Two quarters were sent to the U. S. Geological Survey for analyses, and one quarter was placed in the Division of Mineral Resources coal repository.

CHEMICAL AND PHYSICAL TESTS

Analytical procedures used by the U. S. Department of Energy and the Geochemical Testing, Inc. are described in U. S. Bureau of Mines Bulletin 638 (1967) and ASTM (1982). Determinations included proximate and ultimate analyses, forms of sulfur, ash-fusibility temperatures, calorific values, and free-swelling indexes.

The U. S. Geological Survey analyzed each sample for major-, minor- and trace-elements. Procedures for these analyses as performed by the U. S. Geological Survey laboratory in Denver are described by Swanson and Huffman (1975). Analytical methods used at the U. S. Geological Survey in Reston are similar to those used in Denver and are outlined in Figure 4.

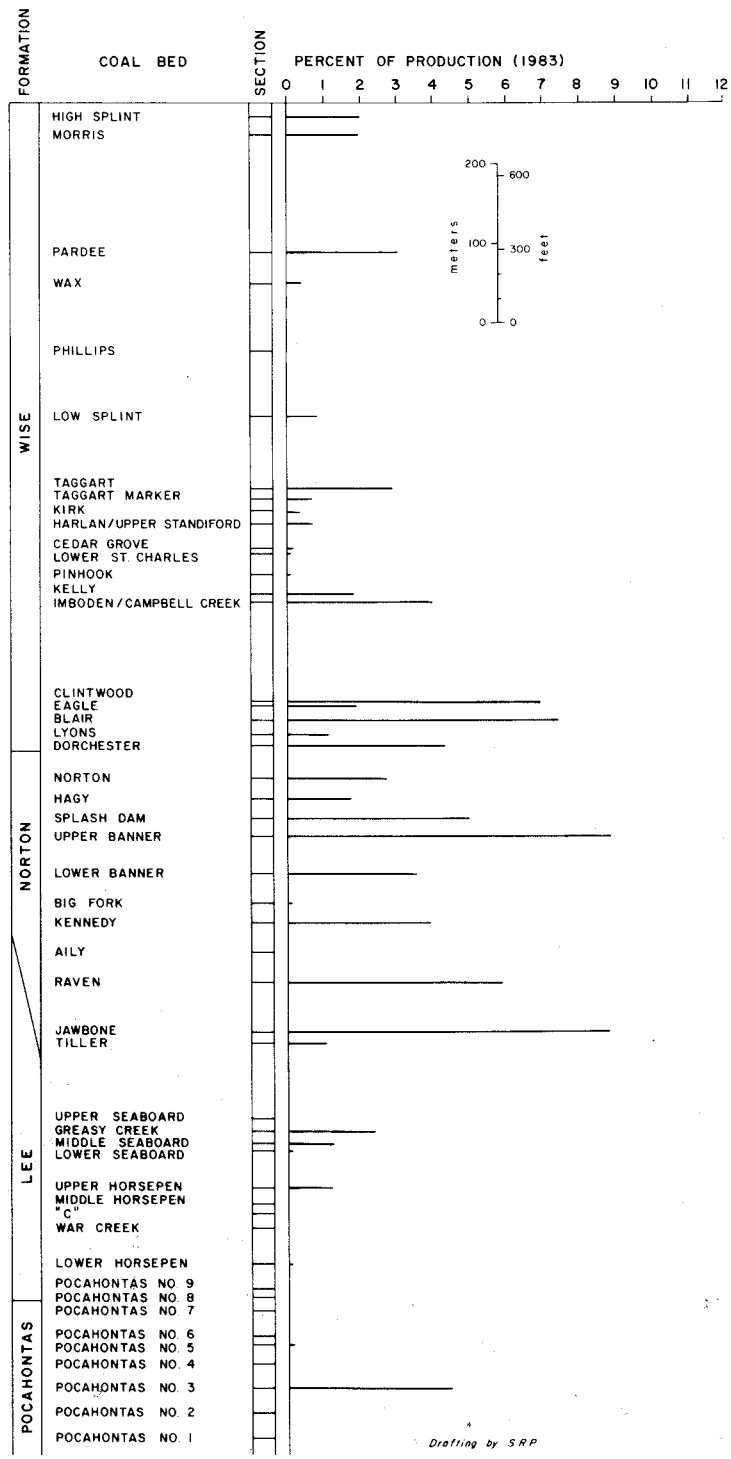

Figure 2. Generalized stratigraphic section of the coals in Southwest Virginia.

RESULTS

Analytical results from the U. S. Department of Energy and Geochemical Testing, Inc. are shown in Table 2; results from analyses performed by the U. S. Geological Survey are shown in Tables 3, 4, and 5; statistical summaries for the 83 samples from Virginia are shown in Table 6.

Analyses from this report and those of Henderson, Oman, and Coleman (1981) were combined for statistical comparison. In all, 217 samples were used from Virginia. Table 7a, 7b and 7c are comparisons of the 217 Virginia coals with 548 Appalachian bituminous coals reported by Zubovic and others (1980).

The ultimate and proximate analyses are nearly identical between the Virginia and Appalachian samples. The heat values are slightly higher for the Virginia coals and the sulfur content is lower than the Appalachian coals. These variables, in conjunction with fusibility and free-swelling index results, indicate use is best suited for power generation as steam coal. Coking tests were not performed for this report.

The concentrations of trace elements, oxides, and ash are similar in most of the Virginia and Appalachian samples. The exception is P_2O_5 content which is five times higher in the Virginia samples. Apatite, a major source of phosphorus, is commonly found in coal ash and may account for the high P_2O_5 value.

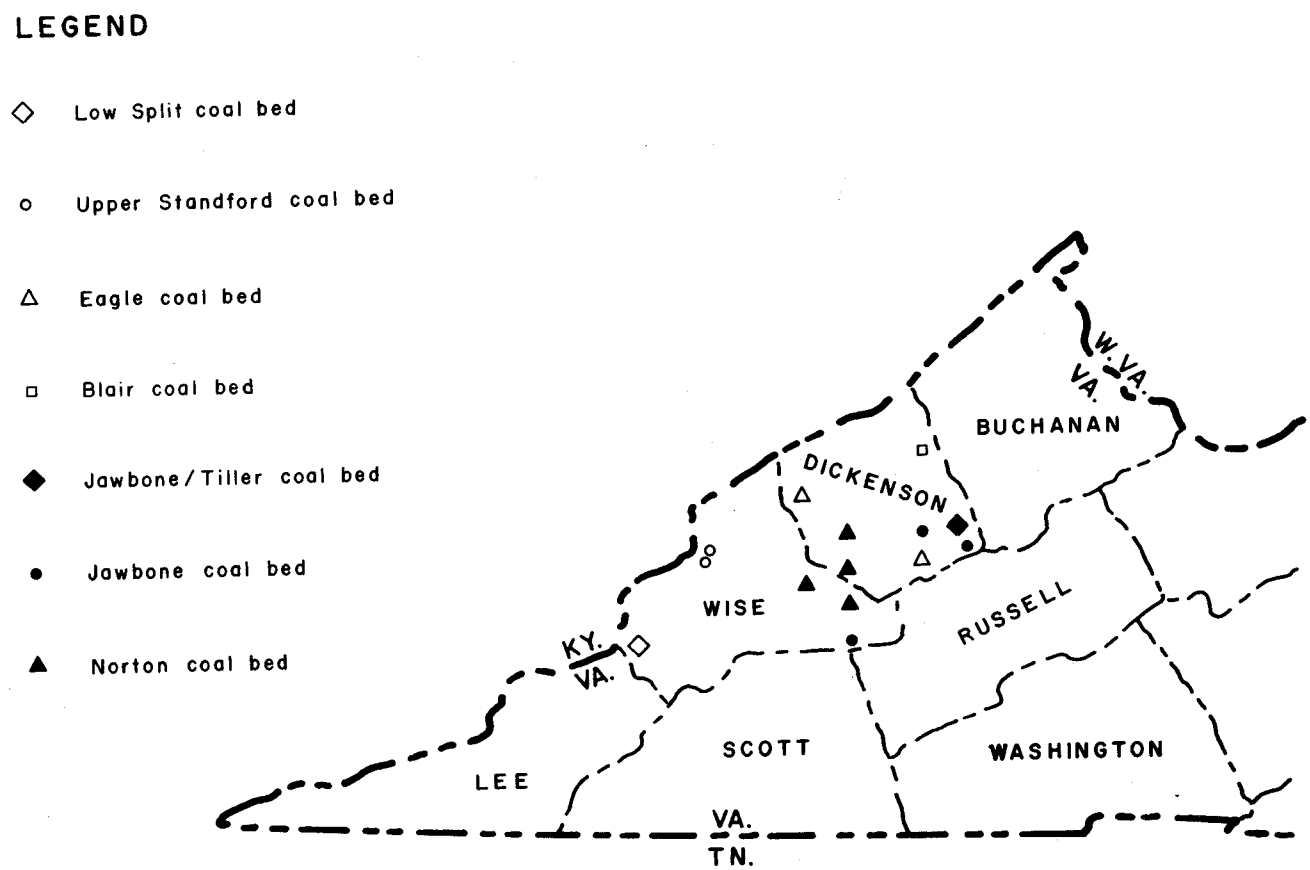

Figure 3a. Location of coal samples by bed.

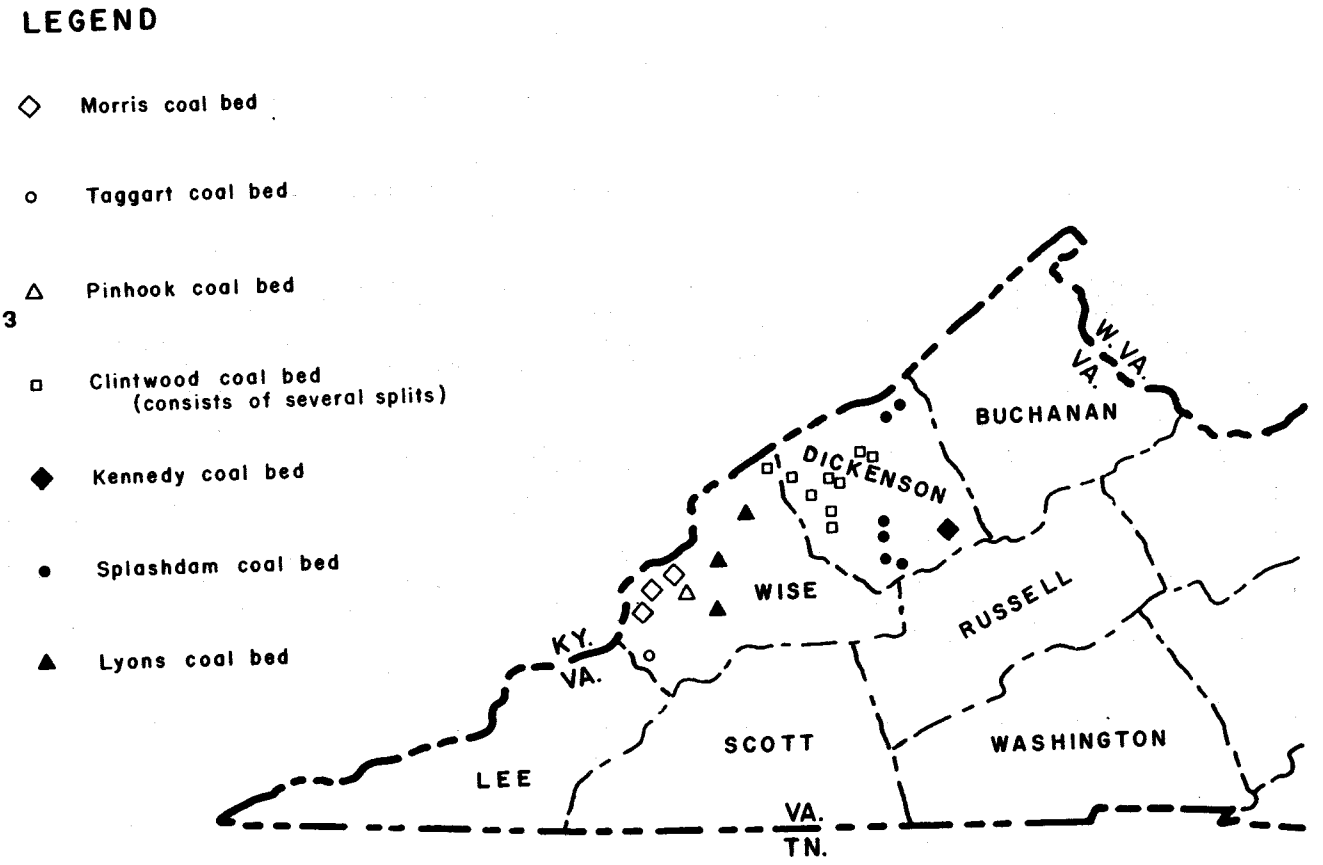

Figure 3b. Location of coal samples by bed.

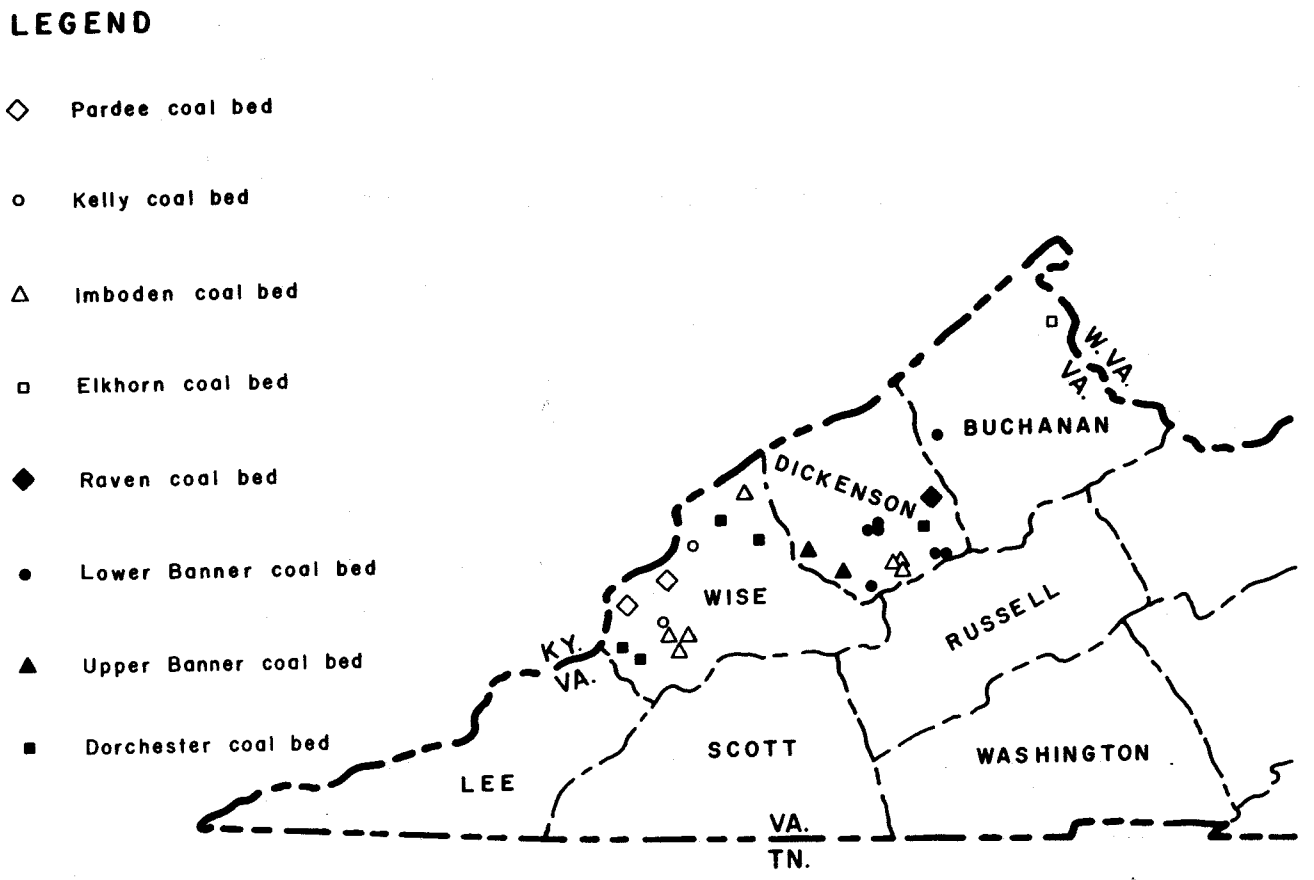

Figure 3c. Location of coal samples by bed.

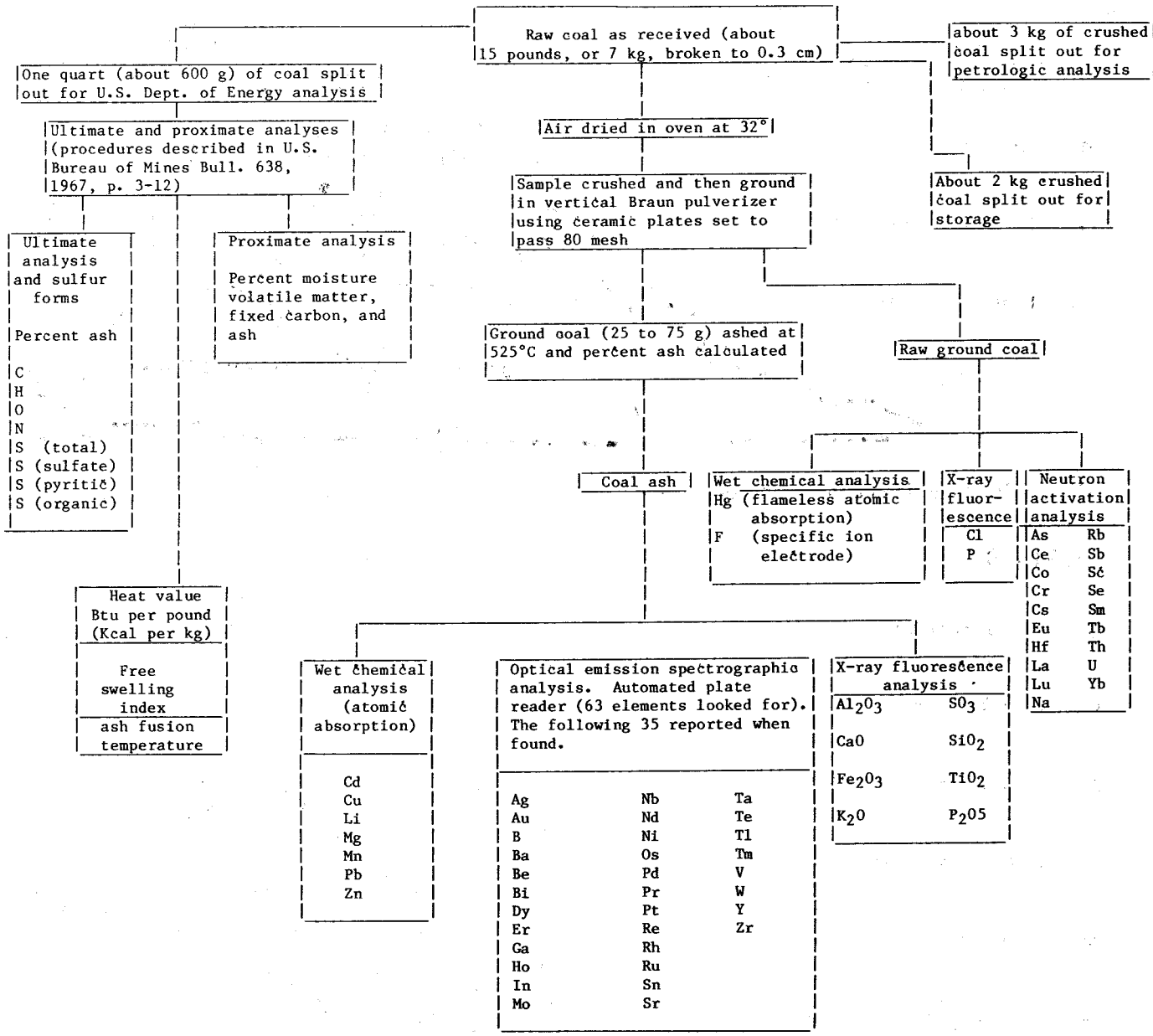

Figure 4. Flow chart of analyses performed on coal samples.

Table 1a. Sample and location information for samples collected in 1978, 1979, and 1980.

Sample Number	UTM Location Type of Exposure	Formation Age	Coal Bed Measured Interval Thickness Sample thickness
BUCHANAN COUNTY			
R-7383	N4123630, E396320 Surface Mine	Norton Pennsylvanian	Banner (lower split) 4.1 ft. (1.2 m) 3.2 ft. or 38.4 in. (0.97 m)
R-7494	N4143000, E414500 Surface Mine	Wise Pennsylvanian	Elkhorn 24.4 + ft. (7.4 + m) 2.4 ft. or 28.8 in. (0.73 m)
DICKENSON COUNTY			
R-7348	N4100760, E368130 Surface Mine	Norton Pennsylvanian	Upper Banner 64.1 + ft. (19.5 + m) 2.5 ft. or 30.0 in. (0.76 m)
R-7351	N4110140, E369590 Surface Mine	Wise Pennsylvanian	Clintwood (upper bench) 33.2 + ft. (10.1 + m) 7.12 ft. or 85.4 in. (2.17 m)
R-7356	N4041999, E397220 Surface Mine	Norton Pennsylvanian	Jawbone 42.29 + ft. (12.9 + m) 4.99 ft. or 59.9 in. (1.52 m)
R-7357	N4097560, E383990 Surface Mine	Norton Pennsylvanian	Upper Banner (lower bench) 48.0 + ft. (14.6 + m) 2.9 ft. or 34.8 in. (0.88 m)
R-7358	N4079560, E383990 Surface Mine	Norton Pennsylvanian	Upper Banner (upper bench) 48.0 + ft. (14.6 + m) 2.19 ft. or 26.3 in. (0.7 m)
R-7359	N4110140, E369590 Surface Mine	Wise Pennsylvanian	Clintwood (lower bench) 33.2 + ft. (10.1 + m) 2.35 ft. or 28.2 in. (0.72 m)
R-7380	N4114300, E368795 Surface Mine	Wise Pennsylvanian	Clintwood Marker 33.2 + ft. (10.1 + m) 1.28 ft. or 15.4 in.) (0.39 m)
R-7381	N4115220, E373300 Surface Mine	Wise Pennsylvanian	Lower Clintwood (upper bench) 53.2 + ft. (16.2 + m) 0.97 ft. or 11.6 in. (0.30 m)
R-7382	N4115220, E373300 Surface Mine	Wise Pennsylvanian	Lower Clintwood (lower bench) 53.2 + ft. (16.2 + m) 1.0 ft. or 12 in. (0.30 m)

R-7465	N4114300, E368210 Surface Mine	Wise Pennsylvanian	Clintwood Split 45.8 + ft. (14.0 + m) 1.48 ft. or 17.8 in. (0.45 m)
R-7491	N4115340, E373002 Surface Mine	Wise Pennsylvanian	Clintwood Split 95.0 + ft. (28.9 + m) 2.65 ft. or 31.8 in. (0.81 m)
R-7492	N4153500, E373000 Surface Mine	Wise Pennsylvanian	Clintwood Rider 91.6 + ft. (27.9 + m) 1.8 ft. or 21.6 in. (0.55 m)
R-7493	N4105080, E373180 Surface Mine	Norton Pennsylvanian	Norton 48.0 + ft. (14.6 + m) 2.05 ft. or 24.6 in. (0.62 m)
R-7545	N4097150, E372590 Underground Mine	Norton Pennsylvanian	Upper Banner 5.6 + ft. (1.7 + m) 3.25 ft. or 39 in. (1.00 m)
R-7546	N4097620, E370430 Surface Mine	Norton Pennsylvanian	Norton 47.2 + ft. (14.4 + m) 3.15 ft. or 37.8 in. (0.96 m)
R-7547	N4112560, E362880 Surface Mine	Wise Pennsylvanian	Clintwood Split 29.2 + ft. (8.9 + m) 1.1 ft. or 13.2 in. (0.33 m)
R-7548	N4099770, E383530 Underground Mine	Norton Pennsylvanian	Lower Banner 4.8 + ft. (1.5 + m) 3.3 ft. or 39.6 in. (1.01 m)
R-7549	N4093620, E383130 Underground Mine	Norton Pennsylvanian	Upper Banner (lower bench) 9.2 + ft. (2.8 + m) 2.45 ft. or 29.4 in. (0.75 m)
R-7550	N4096870, E 383280 Underground Mine	Norton Pennsylvanian	Lower Banner (upper bench) 4.8 + ft. (1.5 + m) 2.85 ft. or 34.2 in. (0.87 m)
R-7551	N4096870, E383280 Underground Mine	Norton Pennsylvanian	Lower Banner (lower bench) 4.8 + ft. (1.5 + m) 0.85 ft. or 10.2 in. (0.26 m)
R-7552	N4098860, E381170 Underground Mine	Norton Pennsylvanian	Splashdam 4.6 + ft. (1.4 + m) 3.95 ft. or 47.4 in. (1.20 m)
R-7553	N4095650, E381920 Underground Mine	Norton Pennsylvanian	Splashdam 2.7 + ft. (0.8 + m) 2.4 ft. or 28.8 in. (0.73 m)

R-7554	N4096060, E381320 Underground Mine	Norton Pennsylvanian	Splashdam 3.4 + ft. (1.0 + m) 3.15 ft. or 37.8 in. (0.96 m)
R-7555	N4099670, E385250 Underground Mine	Norton Pennsylvanian	Lower Banner 3.5 ft. (1.1 m) 2.88 ft. or 34.6 in. (0.88 m)
R-7556	N4099670, E385250 Grab from Underground Mine	Norton Pennsylvanian	Lower Banner Not Applicable Not Applicable
R-7557	N4111110, E366970 Surface Mine	Wise Pennsylvanian	Eagle 32.3 + ft. (9.8 + m) 2.1 ft. or 25.2 in. (0.64 m)
R-7593	N4096160, E380920 Underground Mine	Norton Pennsylvanian	Lower Banner 5.3 + ft. (1.6 + m) 4.7 ft. or 56.4 in. (1.43 m)
R-7594	N4098620, E380610 Underground Mine	Norton Pennsylvanian	Splashdam 4.2 + ft. (1.3 + m) 3.98 ft. or 47.8 in. (1.21 m)
R-7595	N4098570, E386990 Underground Mine	Norton Pennsylvanian	Lower Banner 6.6 + ft. (2.0 + m) 3.2 ft. or 38.4 in. (0.98 m)
R-7596	N4098270, E391930 Underground Mine	Norton Pennsylvanian	Upper Banner 3.4 + ft. (1.0 + m) 2.45 ft. or 29.4 in. (0.75 m)
R-7597	N4098350, E392270 Underground Mine	Norton Pennsylvanian	Lower Banner 5.9 + ft. (1.8 + m) 3.6 ft. or 43.2 in. (1.1 m)
R-7860	N4117370, E379730 Surface Mine	Wise Pennsylvanian	Blair 102.3 + ft. (31.2 + m) 3.9 ft. or 46.8 in. (1.19 m)
R-7861	N4103460, E396790 Underground Mine	Norton Pennsylvanian	Tiller 6.5 + ft. (2.0 + m) 1.3 ft. or 15.6 in. (0.4 m)
R-7862	N4109840, E389220 Underground Mine	Norton Pennsylvanian	Kennedy 3.8 + ft. (1.2 + m) 3.45 ft. or 41.4 in. (1.05 m)
R-7863	N4102090, E391400 Underground Mine	Norton Pennsylvanian	Raven 5.2 + ft. (1.6 + m) 5.05 ft. or 60.6 in. (1.54 m)

R-7864	N4104400, E391101 Underground Mine	Norton Pennsylvanian	Jawbone 7.2 + ft. (2.2 + m) 2.75 ft. or 33 in. (0.84 m)
R-7865	N4108980, E390780 Underground Mine	Norton Pennsylvanian	Kennedy 5.1 + ft. (1.6 + m) 2.0 ft. or 24 in. (0.61 m)
R-7866	N4100960, E389410 Surface Mine	Wise Pennsylvanian	Dorchester 26.1 ft. (8.0 + m) 5.5 ft. or 66 in. (1.68 m)
R-8167	N4117270, E389540 Surface Mine	Wise Pennsylvania	Eagle 43.8 + ft. (13.3 + m) 3.1 ft. or 37.2 in. (0.94 m)
R-8168	N4117270, E387730 Surface Mine	Wise Pennsylvanian	Blair 55.2 + ft. (16.8 + m) 0.85 ft. or 10.2 in. (0.26 m)
R-8169	N4122320, E380820 Underground Mine	Norton Pennsylvanian	Splashdam 6.7 + ft. (2.0 + m) 4.4 ft. or 52.8 in. (1.34 m)
R-8170	N4122330, E381040 Underground Mine	Norton Pennsylvanian	Splashdam 4.8 + ft. (1.5 + m) 4.3 ft. or 51.6 in. (1.31 m)
R-8206	N4111630, E366940 Surface Mine	Wise Pennsylvanian	Clintwood (middle split) 40.0 + ft. (12.1 + m) 3.45 ft. or 41.4 in. (1.05 m)
R-8242	N4109420, E369740 Surface Mine	Wise Pennsylvanian	Clintwood (middle split) 91.6 + ft. (27.9 + m) 6.9 ft. or 82.8 in. (2.10 m)
WISE COUNTY			
R-7324	N4090170, E351460 Surface Mine	Wise Pennsylvanian	Lyons 53.1 + ft. (16.2 + m) 2.7 ft. or 32.4 in. (0.82 m)
R-7325	N4092390, E374180 Surface Mine	Norton Pennsylvanian	Norton 13.9 + ft. (4.2 + m) 1.7 ft. or 20.4 in. (0.52 m)
R-7341	N4099290, E355190 Surface Mine	Wise Pennsylvanian	Lyons 26.7 + ft. (8.1 + m) 1.33 ft. or 16.0 in. (0.40 m)
R-7342	N4099290, E355190 Surface Mine	Wise Pennsylvanian	Lyons 26.4 + ft. (8.0 + m) 1.16 ft. or 13.9 in. (0.35 m)

R-7343	N4091190, E348960 Surface Mine	Wise Pennsylvanian	Imboden 52.1 + ft. (15.9 + m) 3.4 ft. or 40.8 in. (1.046 m)
R-7344	N4088510, E347640 Surface Mine	Wise Pennsylvanian	Imboden (upper bench) 62.8 + ft. (19.2 + m) 2.55 ft. or 30.6 in. (0.78 m)
R-7345	N4088510, E347640 Surface Mine	Wise Pennsylvanian	Imboden (lower bench) 62.8 + ft. (19.2 + m) 3.0 ft. or 36 in. (0.91 m)
R-7346	N4086490, E379880 Surface Mine	Norton Pennsylvanian	Jawbone 39.6 + ft. (12.0 + m) 3.5 ft.
R-7347	N4102340, E354040 Surface Mine	Wise Pennsylvanian	Upper Standiford 26.3 + ft. (8.0 + m) 2.07 ft. or 24.8 in. (0.63 m)
R-7349	N4093560, E373100 Surface Mine	Norton Pennsylvanian	Norton (upper bench) 26.2 + ft. (8.0 + m) 1.6 ft. or 19.2 in. (0.49 m)
R-7350	N4093560, E373100 Surface Mine	Norton Pennsylvanian	Norton (lower bench) 26.2 + ft. (8.0 + m) 0.45 ft. or 5.4 in. (0.14 m)
R-7354	N4095655, E367295 Surface Mine	Norton Pennsylvanian	Norton 61.0 + ft. (18.6 + m) 1.95 ft. or 23.4 in. (0.59 m)
R-7355	N4095695, E367295 Surface Mine	Norton Pennsylvanian	Norton 61.0 + ft. (18.6 + m) 1.95 ft. or 23.4 in. (0.59 m)
R-7366	N4095790, E337630 Underground Mine	Wise Pennsylvanian	Morris 4.9 + ft. (1.5 + m) 4.53 ft. or 54.4 in. (1.38 m)
R-7367	N4096830, E340840 Surface Mine	Wise Pennsylvanian	Morris 30.0 + ft. (9.2 + m) 3.83 ft. or 46.0 in. (1.17 m)
R-7406	N4085100, E340150 Underground Mine	Wise Pennsylvanian	Dorchester 5.0 + ft. (1.5 + m) 4.32 ft. or 51.8 in. (1.32 m)
R-7407	N4086990, E337000 Underground Mine	Wise Pennsylvanian	Dorchester 5.0 + ft. (1.5 + m) 4.16 ft. or 49.9 in. (1.27 m)

R-7408	N4083560, E333590 Underground Mine	Wise Pennsylvanian	Taggart 6.4 + ft. (2.0 + m) 4.50 ft. or 55.1 in. (2.4 m)
R-7409	N4084350, E333350 Underground Mine	Wise Pennsylvanian	Low Splint (lower bench) 6.4 + ft. (2.0 + m) 3.24 ft. or 38.9 in. (0.99 m)
R-7410	N4084350, E333350 Underground Mine	Wise Pennsylvanian	Low Splint (upper bench) 6.4 + ft. (2.0 + m) 2.02 ft. or 24.2 in. (0.62 m)
R-7411	N4091850, E334770 Underground Mine	Wise Pennsylvanian	Pardee 6.0 + ft. (1.8 + m) 5.21 ft. or 62.5 in. (1.59 m)
R-7412	N4094760, E336750 Underground Mine	Wise Pennsylvanian	Morris 6.8 + ft. (2.1 + m) 6.1 ft. or 73.2 in. (1.86 m)
R-7515	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Imboden (lower bench, bottom split 73.6 + ft. (22.4 + m) 0.5 ft. or 6 in. (0.15 m)
R-7516	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Imboden (lower bench, middle split 73.6 + ft. (22.4 + m) 2.2 ft. or 26.4 in. (0.67 m)
R-7517	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Imboden (lower bench, upper split) 73.6 + ft. (22.4 + m) 1.85 ft. or 22.2 in. (0.56 m)
R-7518	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Imboden (upper bench) 73.6 + ft. (22.4 + m) 2.85 ft. or 34.2 in. (0.87 m)
R-7519	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Kelly 73.6 + ft. (22.4 + m) 4.7 ft. or 56.4 in. (1.43 m)
R-7520	N4091100, E348235 Surface Mine	Wise Pennsylvanian	Pinhook 73.6 + ft. (22.4 + m) 1.65 ft. or 19.8 in. (0.50 m)
R-8165	N4099610, E345845 Underground Mine	Wise Pennsylvanian	Pardee (upper bench) 7.7 + ft. (2.4 + m) 3.3 ft. or 39.6 in. (1.0 m)
R-8166	N4099610, E345845 Underground Mine	Wise Pennsylvanian	Pardee (lower bench) 7.7 + ft. (2.4 + m) 3.8 ft. or 45.6 in. (1.16 m)

R-8207	N4101920, E353390 Surface Mine	Wise Pennsylvanian	Upper Standiford 24.4 + ft. (7.4 + m) 3.0 ft. or 36.0 in. (0.91 m)
R-8208	N4101740, E355960 Underground Mine	Wise Pennsylvanian	Imboden 3.3 + ft. (1.0 + m) 3.1 ft. or 37.2 in. (0.94 m)
R-8209	N4111920, E361450 Surface Mine	Wise Pennsylvanian	Imboden 73.0 + ft. (22.2 + m) 3.0 ft. or 36 in. (0.91 m)
R-8210	N4113020, E362370 Surface Mine	Wise Pennsylvanian	Clintwood Split 45.6 + ft. (13.9 + m) 3.75 ft. or 45 in. (1.14 m)
R-8241	N4102360, E362100 Underground Mine	Wise Pennsylvanian	Dorchester 3.6 + ft. (1.1 + m) 2.2 ft. or 26.4 in. (0.67 m)
R-8243	N4105230, E358810 Surface Mine	Wise Pennsylvanian	Lyons 100.3 + ft. (30.6 + m) 2.55 ft. or 30.6 in. (0.78 m)
R-8244	N4105460, E358810 Surface Mine	Wise Pennsylvanian	Dorchester 100.3 + ft. (30.6 + m) 2.85 ft. or 34.2 in. (0.87 m)

Table 1b. Descriptions for coal samples from Buchanan County.

U.S.G.S. Analysis No.	V.D.M.R. Sample No.	County	Latitude	Longitude	Formation	Coal Bed	Rank	Sample type	Sampled thickness (inches)
w204620	R-7383	Buchanan	371519n	821011w	Norton	Banner	Bituminous	Channel	38.4
w206890	R-7494	Buchanan	372523n	815758w	Wise	Elkhorn	Bituminous	Channel	28.8

Table 1c. Descriptions for coal samples from Dickenson County.

U.S.G.S. Analysis No.	V.D.M.R. Sample No.	County	Latitude	Longitude	Formation	Coal Bed	Rank	Sample type	Sampled thickness (inches)
w202130	R-7324	Wise	365652n	824007w	Wise	Lyons	Bituminous	Channel	32.4
w202129	R-7325	Wise	365815n	822424w	Norton	Norton	Bituminous	Channel	20.4
w203394	R-7341	Wise	370149n	823740w	Wise	Lyons	Bituminous	Channel	16.0
w203393	R-7342	Wise	370149n	823740w	Wise	Lyons	Bituminous	Channel	13.9
w203387	R-7343	Wise	365722n	824147w	Wise	Imboden	Bituminous	Channel	40.8
w203386	R-7344	Wise	365555n	824238w	Wise	Upper Imboden	Bituminous	Channel	30.6
w203385	R-7345	Wise	365555n	824238w	Wise	Lower Imboden	Bituminous	Channel	36.0
w203384	R-7346	Wise	365506n	822054w	Norton	Jawbone	Bituminous	Channel	42.0
w203389	R-7347	Wise	370327n	823829w	Wise	Upper Standiford	Bituminous	Channel	24.8
w203388	R-7349	Wise	365851n	822541w	Wise	Upper Norton	Bituminous	Channel	19.2
w203391	R-7350	Wise	365851n	822541w	Norton	Lower Norton	Bituminous	Channel	5.4
w204157	R-7354	Wise	365957n	822952w	Norton	Norton	Bituminous	Channel	23.4
w204158	R-7355	Wise	365957n	822952w	Norton	Norton	Bituminous	Channel	23.4
w204163	R-7366	Wise	365946n	824930w	Wise	Morris	Bituminous	Channel	54.4
w204164	R-7367	Wise	370021n	824719w	Wise	Morris	Bituminous	Channel	46.0
w205190	R-7406	Wise	365400n	824739w	Wise	Dorchester	Bituminous	Channel	51.8
w205191	R-7407	Wise	365458n	824949w	Wise	Dorchester	Bituminous	Channel	49.9
w205192	R-7408	Wise	365305n	825203w	Wise	Taggart	Bituminous	Channel	55.1
w205193	R-7409	Wise	365331n	825212w	Wise	Low Splint	Bituminous	Channel	38.9
w205194	R-7410	Wise	365331n	825212w	Wise	Low Splint	Bituminous	Channel	24.2
w205195	R-7411	Wise	365734n	825121w	Wise	Pardee	Bituminous	Channel	62.5
w205196	R-7412	Wise	365910n	825003w	Wise	Morris	Bituminous	Channel	73.2
w208044	R-7515	Wise	365719n	824217w	Wise	Imboden	Bituminous	Channel	6.0
w208045	R-7516	Wise	365717n	824217w	Wise	Imboden	Bituminous	Channel	26.4
w208046	R-7517	Wise	365719n	824217w	Wise	Imboden	Bituminous	Channel	22.2
w208047	R-7518	Wise	365719n	824217w	Wise	Imboden	Bituminous	Channel	34.2
w208048	R-7519	Wise	365719n	824217w	Wise	Kelly	Bituminous	Channel	56.4
w208049	R-7520	Wise	365719n	824217w	Wise	Pinhook	Bituminous	Channel	19.8
w211679	R-8165	Wise	370154n	824358w	Wise	Pardee	Bituminous	Channel	39.6
w211678	R-8166	Wise	370154n	824358w	Wise	Pardee	Bituminous	Channel	45.6
w212488	R-8207	Wise	370313n	823855w	Wise	Upper Standiford	Bituminous	Channel	36.0
w212491	R-8208	Wise	370308n	823711w	Wise	Imboden	Bituminous	Channel	37.2
w212489	R-8209	Wise	370842n	823336w	Wise	Imboden	Bituminous	Channel	36.0
w212490	R-8210	Wise	370918n	823259w	Wise	Clintwood	Bituminous	Channel	45.0
w212492	R-8241	Wise	370332n	823303w	Wise	Dorchester	Bituminous	Channel	26.4
w212493	R-8243	Wise	370503n	823519w	Wise	Lyons	Bituminous	Channel	30.6
w212494	R-8244	Wise	370510n	823519w	Wise	Dorchester	Bituminous	Channel	34.2

Table 1d. Descriptions for coal samples from Wise County.

U.S.G.S. Analysis No.	V.D.M.R. Sample No.	County	Latitude	Longitude	Formation	Coal Bed	Rank	Sample type	Sampled thickness (inches)
w203390	R-7348	Dickenson	370246n	822858w	Norton	Upper Banner	Bituminous	Channel	30.0
w203392	R-7351	Dickenson	370749n	822804w	Wise	Upper Clintwood	Bituminous	Channel	85.4
w204159	R-7356	Dickenson	370303n	820922w	Norton	Jawbone	Bituminous	Channel	59.9
w204160	R-7357	Dickenson	370108n	821814w	Norton	Upper Banner	Bituminous	Channel	34.8
w204161	R-7358	Dickenson	370108n	821814w	Norton	Upper Banner	Bituminous	Channel	26.3
w204162	R-7359	Dickenson	370749n	822804w	Wise	Lower Clintwood	Bituminous	Channel	28.2
w204617	R-7380	Dickenson	371003n	822840w	Wise	Clintwood Marker	Bituminous	Channel	15.4
w204618	R-7381	Dickenson	371036n	822537w	Wise	Clintwood	Bituminous	Channel	11.6
w204619	R-7382	Dickenson	371036n	822537w	Wise	Clintwood	Bituminous	Channel	12.0
w206886	R-7465	Dickenson	371003n	822903w	Wise	Clintwood	Bituminous	Channel	17.8
w206887	R-7491	Dickenson	371040n	822548w	Wise	Clintwood	Bituminous	Channel	31.8
w206888	R-7492	Dickenson	371042n	822549w	Wise	Clintwood Rider	Bituminous	Channel	21.6
w206889	R-7493	Dickenson	370506n	822536w	Norton	Norton	Bituminous	Channel	24.6
w209959	R-7545	Dickenson	370050n	822556w	Norton	Upper Banner	Bituminous	Channel	39.0
w209960	R-7546	Dickenson	370104n	822724w	Norton	Norton	Bituminous	Channel	37.8
w209961	R-7547	Dickenson	370904n	823238w	Norton	Clintwood Split	Bituminous	Channel	13.2
w209962	R-7548	Dickenson	370220n	821834w	Norton	Lower Banner	Bituminous	Channel	39.6
w209963	R-7549	Dickenson	370028n	821848w	Norton	Upper Banner	Bituminous	Channel	29.4
w210391	R-7550	Dickenson	370045n	821844w	Norton	Lower Banner	Bituminous	Channel	34.2
w210392	R-7551	Dickenson	370045n	821844w	Norton	Lower Banner	Bituminous	Channel	10.2
w210393	R-7552	Dickenson	370149n	822008w	Norton	Splash Dam	Bituminous	Channel	47.4
w210394	R-7553	Dickenson	370005n	821937w	Norton	Splash Dam	Bituminous	Channel	28.8
w210395	R-7554	Dickenson	370018n	822003w	Norton	Splash Dam	Bituminous	Channel	37.8
w210396	R-7555	Dickenson	370218n	821723w	Norton	Lower Banner	Bituminous	Channel	34.6
w210403	R-7556	Dickenson	370218n	821723w	Norton	Lower Banner	Bituminous	Run of Mine	
w210397	R-7557	Dickenson	370819n	822952w	Wise	Eagle	Bituminous	Channel	25.2
w210398	R-7593	Dickenson	370022n	822017w	Norton	Lower Banner	Bituminous	Channel	56.4
w210399	R-7594	Dickenson	370140n	822031w	Norton	Splash Dam	Bituminous	Channel	47.8
w210400	R-7595	Dickenson	370143n	821611w	Norton	Lower Banner	Bituminous	Channel	38.4
w210401	R-7596	Dickenson	370133n	821252w	Norton	Upper Banner	Bituminous	Channel	29.4
w210402	R-7597	Dickenson	370135n	821239w	Norton	Lower Banner	Bituminous	Channel	43.2
w211174	R-7860	Dickenson	371151n	821555w	Wise	Blair	Bituminous	Channel	46.8
w211169	R-7861	Dickenson	370424n	820945w	Norton	Tiller	Bituminous	Channel	15.6
w211168	R-7862	Dickenson	370748n	821449w	Norton	Kennedy	Bituminous	Channel	41.4
w211170	R-7863	Dickenson	370337n	821317w	Norton	Raven	Bituminous	Channel	60.6
w211171	R-7864	Dickenson	370452n	821331w	Norton	Jawbone	Bituminous	Channel	33.0
w211172	R-7865	Dickenson	370719n	821346w	Norton	Kennedy	Bituminous	Channel	24.0
w211173	R-7866	Dickenson	370259n	821436w	Wise	Dorchester	Bituminous	Channel	66.0
w211674	R-8167	Dickenson	370221n	821431w	Wise	Eagle	Bituminous	Channel	37.2
w211675	R-8168	Dickenson	371150n	821554w	Wise	Blair	Bituminous	Channel	10.2
w211676	R-8169	Dickenson	371427n	822038w	Norton	Splash Dam	Bituminous	Channel	52.8
w211677	R-8170	Dickenson	371429n	822027w	Norton	Splash Dam	Bituminous	Channel	51.6
w212486	R-8206	Dickenson	370836n	822953w	Wise	Clintwood	Bituminous	Channel	41.4
w212487	R-8242	Dickenson	370726n	822757w	Wise	Clintwood	Bituminous	Channel	82.8

TABLE 2A.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 2 BITUMINOUS COAL SAMPLES FROM BUCHANAN COUNTY, VIRGINIA.

[ALL ANALYSES EXCEPT KCAL/KG, BTU, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURES IN PERCENT. FOR EACH SAMPLE NUMBER, THE ANALYSES ARE REPORTED THREE WAYS; FIRST, AS-RECEIVED, SECOND, MOISTURE-FREE, AND THIRD, MOISTURE- AND ASH-FREE. ANALYSES BY COAL ANALYSIS SECTION, DEPARTMENT OF ENERGY, PITTSBURGH, PA. AND A COMMERCIAL TESTING LABORATORY FOLLOWING AST STANDARDS. G FOR ASH-FUSION TEMPERATURES MEANS GREATER THAN.]

	PROXIMATE ANALYSIS				ULTIMATE ANALYSIS					HEAT OF COMBUSTION	
SAMPLE NUMBER	MOISTURE	VOLATILE MATTER	FIXED CARBON	ASH	HYDROGEN	CARBON	NITROGEN	OXYGEN	SULFUR	KCAL/KG	BTU/LB
R-7383	3.6	23.3	44.9	28.2	4.1	58.5	1.1	7.4	0.6	5,720	10,300
	---	24.2	46.6	29.3	3.8	60.7	1.1	4.4	.6	5,940	10,690
	---	34.2	65.8	---	5.4	85.8	1.6	6.2	.9	8,390	15,110
R-7494	3.3	33.2	57.1	6.4	5.6	78.5	1.6	7.2	.3	7,740	13,940
	---	34.3	59.0	6.6	5.4	81.2	1.7	4.4	.8	8,010	14,410
	---	36.8	63.2	---	5.8	86.9	1.8	4.7	.9	8,570	15,430

	FORMS OF SULFUR					ASH-FUSION TEMPERATURE, C		
SAMPLE NUMBER	AIR-DRIED LOSS	SULFATE	PYRITIC	ORGANIC	FREE-SWELLING INDEX	INITIAL DEFORMATION	SOFTENING	FLUID
R-7383	2.7	0.01	0.19	0.44	4.5	1,540G	1,540G	1,540G
	---	.01	.20	.46				
	---	.01	.28	.65				
R-7494	2.1	.01	.23	.53	9.0	1,540G	1,540G	1,540G
	---	.01	.24	.55				
	---	.01	.25	.59				

TABLE 28.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA.

[ALL ANALYSES EXCEPT KCAL/KG, BTU, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURES IN PERCENT. FOR EACH SAMPLE NUMBER, THE ANALYSES ARE REPORTED THREE WAYS; FIRST, AS-RECEIVED, SECOND, MOISTURE-FREE, AND THIRD, MOISTURE- AND ASH-FREE. ANALYSES BY COAL ANALYSIS SECTION, DEPARTMENT OF ENERGY, PITTSBURGH, PA. AND A COMMERCIAL TESTING LABORATORY FOLLOWING AST STANDARDS. G FOR ASH-FUSION TEMPERATURES MEANS GREATER THAN.]

	PROXIMATE ANALYSIS				ULTIMATE ANALYSIS					HEAT OF COMBUSTION	
SAMPLE NUMBER	MOISTURE	VOLATILE MATTER	FIXED CARBON	ASH	HYDROGEN	CARBON	NITROGEN	OXYGEN	SULFUR	KCAL/KG	BTU/LB
R-7348	2.8	28.8	58.1	10.3	5.1	76.1	1.3	6.3	0.9	7,520	13,530
	---	29.6	59.8	10.6	4.9	78.3	1.3	3.9	.9	7,740	13,920
	---	33.1	66.9	---	5.5	87.6	1.5	4.4	1.0	8,650	15,580
R-7351	3.9	33.7	57.7	4.7	5.5	79.0	1.8	8.2	.8	7,850	14,140
	---	35.1	60.0	4.9	5.3	82.2	1.9	4.9	.8	8,170	14,710
	---	36.9	63.1	---	5.5	86.4	2.0	5.2	.9	8,590	15,470
R-7356	4.0	25.6	57.0	13.4	4.8	72.1	1.4	7.7	.6	7,080	12,740
	---	26.7	59.4	14.0	4.5	75.1	1.5	4.3	.6	7,370	13,270
	---	31.0	69.0	---	5.3	87.3	1.7	5.0	.7	8,570	15,420
R-7357	3.3	32.6	60.5	3.6	5.4	81.8	1.5	7.1	.6	8,040	14,470
	---	33.7	62.6	3.7	5.2	84.6	1.6	4.3	.6	8,310	14,960
	---	35.0	65.0	---	5.4	87.9	1.6	4.5	.6	8,630	15,540
R-7358	3.4	28.8	52.0	15.8	4.9	69.2	1.4	8.0	.6	6,880	12,380
	---	29.8	53.8	16.4	4.7	71.6	1.4	5.2	.6	7,120	12,820
	---	35.6	64.4	---	5.6	85.6	1.7	6.2	.7	8,510	15,330
R-7359	2.2	30.8	55.9	11.1	5.0	74.4	1.5	7.1	.9	7,440	13,400
	---	31.5	57.2	11.3	4.9	76.1	1.5	5.3	.9	7,610	13,700
	---	35.5	64.5	---	5.5	85.8	1.7	5.9	1.0	8,580	15,450
R-7380	4.0	34.6	57.8	3.6	5.8	79.7	1.7	8.3	.9	7,920	14,260
	---	36.0	60.2	3.7	5.6	83.0	1.8	4.9	.9	8,250	14,860
	---	37.4	62.6	---	5.8	86.3	1.8	5.1	1.0	8,580	15,440
R-7381	3.9	31.6	57.5	7.0	5.3	76.3	1.5	9.0	.8	7,550	13,590
	---	32.9	59.8	7.3	5.1	79.4	1.6	5.8	.8	7,860	14,150
	---	35.5	64.5	---	5.5	85.6	1.7	6.2	.9	8,480	15,260
R-7382	3.4	30.8	54.2	11.6	4.9	72.6	1.4	8.5	.9	7,180	12,930
	---	31.9	56.1	12.0	4.7	75.2	1.4	5.7	.9	7,430	13,380
	---	36.2	63.8	---	5.3	85.4	1.6	6.4	1.1	8,450	15,210
R-7465	3.7	34.5	55.4	6.4	5.9	76.5	1.7	7.9	1.6	7,630	13,740
	---	35.8	57.5	6.6	5.7	79.4	1.8	4.8	1.7	7,930	14,270
	---	38.4	61.6	---	6.1	85.1	1.9	5.1	1.8	8,490	15,280
R-7491	4.0	33.2	56.5	6.3	5.6	77.0	1.8	8.1	1.3	7,670	13,800
	---	34.6	58.9	6.6	5.4	80.2	1.9	4.7	1.4	7,990	14,370
	---	37.0	63.0	---	5.7	85.8	2.0	5.1	1.4	8,550	15,390
R-7492	3.4	33.7	59.0	3.9	5.8	79.5	1.8	7.4	1.6	7,960	14,330
	---	34.9	61.1	4.0	5.6	82.3	1.9	4.5	1.7	8,240	14,830
	---	36.4	63.6	---	5.8	85.8	1.9	4.7	1.7	8,590	15,460
R-7493	3.9	29.9	61.6	4.6	5.5	80.2	1.6	7.1	.9	7,890	14,200
	---	31.1	64.1	4.8	5.3	83.5	1.7	3.8	.9	8,210	14,780
	---	32.7	67.3	---	5.5	87.7	1.7	4.0	1.0	8,620	15,520
R-7545	2.0	31.7	60.0	6.3	5.1	79.7	1.5	6.7	.6	7,910	14,240
	---	32.3	61.2	6.4	5.0	81.3	1.5	5.0	.6	8,070	14,530
	---	34.6	65.4	---	5.3	86.9	1.6	5.4	.7	8,620	15,520
R-7546	3.7	30.9	57.0	8.4	5.7	75.0	1.5	8.4	1.0	7,480	13,470
	---	32.1	59.2	8.7	5.5	77.9	1.6	5.3	1.0	7,770	13,990
	---	35.2	64.8	---	6.0	85.3	1.7	5.8	1.1	8,510	15,320
R-7547	8.9	34.1	49.2	7.8	5.9	69.8	1.5	12.3	2.6	7,050	12,690
	---	37.4	54.0	8.6	5.4	76.6	1.6	4.8	2.9	7,740	13,930
	---	40.9	59.1	---	5.9	83.8	1.8	5.3	3.1	8,460	15,230
R-7548	2.5	28.2	56.4	12.9	4.9	72.8	1.4	7.0	1.1	7,220	12,990
	---	28.9	57.8	13.2	4.7	74.7	1.4	4.9	1.1	7,400	13,330
	---	33.3	66.7	---	5.5	86.1	1.7	5.6	1.3	8,530	15,360
R-7549	2.0	31.8	57.2	9.0	5.4	77.0	1.4	6.4	.7	7,570	13,620
	---	32.4	58.4	9.2	5.3	78.6	1.4	4.7	.7	7,720	13,900
	---	35.7	64.3	---	5.8	86.5	1.6	5.2	.8	8,500	15,300
R-7550	1.3	44.5	47.3	6.9	5.2	80.0	1.6	5.5	.8	7,930	14,270
	---	45.1	47.9	7.0	5.1	81.1	1.6	4.4	.8	8,030	14,460
	---	48.5	51.5	---	5.5	87.1	1.7	4.7	.9	8,640	15,550
R-7551	1.5	19.7	28.5	50.3	3.0	39.2	.8	5.6	1.0	3,860	6,950
	---	20.0	28.9	51.1	2.9	39.8	.8	4.3	1.0	3,920	7,050
	---	40.9	59.1	---	5.9	81.3	1.7	8.9	2.1	8,010	14,410
R-7552	2.0	29.6	59.3	9.1	5.2	77.0	1.5	6.3	1.0	7,680	13,820
	---	30.2	60.5	9.3	5.1	78.6	1.5	4.6	1.0	7,840	14,100
	---	33.3	66.7	---	5.6	86.6	1.7	5.1	1.1	8,640	15,550
R-7553	1.9	33.5	55.0	9.6	5.3	75.4	1.4	6.5	1.8	7,560	13,600
	---	34.1	56.1	9.8	5.2	76.9	1.4	4.9	1.8	7,700	13,860
	---	37.9	62.1	---	5.8	85.2	1.6	5.4	2.0	8,540	15,370
R-7554	3.0	34.8	55.1	7.1	5.4	74.8	1.4	7.1	4.1	7,640	13,750
	---	35.9	56.8	7.3	5.2	77.1	1.4	4.6	4.2	7,880	14,180
	---	38.7	61.3	---	5.6	83.2	1.6	4.9	4.6	8,500	15,300

TABLE 2B.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

	PROXIMATE ANALYSIS				ULTIMATE ANALYSIS					HEAT OF COMBUSTION	
SAMPLE NUMBER	MOISTURE	VOLATILE MATTER	FIXED CARBON	ASH	HYDROGEN	CARBON	NITROGEN	OXYGEN	SULFUR	KCAL/KG	BTU/LB
R-7555	2.2	28.4	58.2	11.2	5.0	74.1	1.4	7.0	1.1	7,380	13,280
	---	29.0	59.5	11.5	4.9	75.8	1.4	5.2	1.1	7,550	13,580
	---	32.8	67.2	---	5.5	85.6	1.6	5.8	1.3	8,520	15,340
R-7556	3.1	22.8	40.7	33.4	4.0	54.3	1.1	6.2	.9	5,380	9,690
	---	23.5	42.0	34.5	3.8	56.0	1.1	3.6	.9	5,560	10,000
	---	35.9	64.1	---	5.8	85.5	1.7	5.4	1.4	8,480	15,260
R-7557	3.9	30.8	52.1	13.2	5.3	71.0	1.4	8.0	1.1	7,090	12,760
	---	32.0	54.2	13.7	5.1	73.9	1.5	4.7	1.1	7,370	13,270
	---	37.2	62.8	---	5.9	85.6	1.7	5.5	1.3	8,550	15,390
R-7593	1.6	30.0	53.1	15.3	4.8	72.0	1.4	5.6	.8	7,140	12,850
	---	30.5	54.0	15.5	4.7	73.2	1.4	4.2	.8	7,260	13,060
	---	36.1	63.9	---	5.6	86.6	1.7	5.0	1.0	8,590	15,470
R-7594	3.3	42.9	32.1	21.7	4.5	64.6	1.2	7.3	.7	6,240	11,240
	---	44.4	33.2	22.4	4.3	66.8	1.2	4.5	.7	6,460	11,620
	---	57.2	42.8	---	5.5	86.1	1.6	5.8	.9	8,320	14,980
R-7595	2.4	30.5	60.0	7.1	5.4	78.8	1.5	6.3	.8	7,820	14,080
	---	31.2	61.5	7.3	5.3	80.7	1.5	4.3	.8	8,010	14,420
	---	33.7	66.3	---	5.7	87.1	1.7	4.6	.9	8,640	15,550
R-7596	1.5	33.1	50.5	14.9	5.0	70.5	1.3	6.1	2.2	7,130	12,830
	---	33.6	51.3	15.1	4.9	71.6	1.3	4.8	2.2	7,240	13,030
	---	39.6	60.4	---	5.8	84.3	1.6	5.7	2.6	8,530	15,350
R-7597	3.8	32.2	57.5	6.5	5.9	77.8	1.5	7.6	.8	7,740	13,920
	---	33.5	59.8	6.8	5.7	80.9	1.6	4.4	.8	8,040	14,470
	---	35.9	64.1	---	6.1	86.7	1.7	4.7	.9	8,620	15,520
R-7860	2.7	30.4	55.9	11.0	5.0	73.3	1.4	6.5	2.8	7,290	13,120
	---	31.2	57.5	11.3	4.8	75.3	1.4	4.2	2.9	7,490	13,490
	---	35.2	64.8	---	5.4	84.9	1.6	4.7	3.3	8,450	15,210
R-7861	1.8	23.4	56.5	18.3	4.4	70.0	1.2	5.5	.6	6,790	12,220
	---	23.8	57.6	18.6	4.3	71.2	1.2	4.0	.6	6,910	12,440
	---	29.3	70.7	---	5.3	87.5	1.5	5.0	.8	8,490	15,280
R-7862	1.4	20.5	55.3	22.6	4.1	64.6	1.2	6.8	.7	6,500	11,700
	---	21.1	56.1	22.9	4.0	65.5	1.2	5.7	.8	6,590	11,860
	---	27.3	72.7	---	5.2	84.9	1.6	7.4	1.0	8,550	15,380
R-7863	2.0	22.9	50.5	24.6	4.1	63.6	1.2	6.0	.5	6,260	11,260
	---	23.4	51.5	25.1	4.0	65.0	1.2	4.3	.5	6,390	11,490
	---	31.2	68.8	---	5.3	86.7	1.6	5.7	.7	8,520	15,340
R-7864	1.5	19.8	53.6	25.1	4.0	64.2	1.1	5.2	0.5	6,220	11,200
	---	20.1	54.5	25.5	3.9	65.2	1.1	3.8	.6	6,320	11,370
	---	26.9	73.1	---	5.2	87.4	1.4	5.2	.7	8,480	15,260
R-7865	2.5	19.1	48.8	29.5	3.9	58.3	1.1	5.7	1.5	5,780	10,400
	---	19.6	50.1	30.3	3.7	59.8	1.1	3.6	1.5	5,930	10,670
	---	28.1	71.9	---	5.3	85.8	1.6	5.1	2.1	8,510	15,310
R-7866	2.2	28.9	53.2	15.7	4.8	70.8	1.4	6.7	.6	6,980	12,560
	---	29.6	54.4	16.0	4.7	72.4	1.4	4.8	.6	7,140	12,840
	---	35.2	64.8	---	5.6	86.2	1.7	5.8	.7	8,500	15,290
R-8167	2.1	33.3	61.2	3.4	5.4	81.4	1.5	7.5	.8	8,020	14,430
	---	34.0	62.5	3.5	5.3	83.2	1.6	5.7	.8	8,190	14,730
	---	35.2	64.8	---	5.5	86.2	1.6	5.9	.8	8,480	15,260
R-8168	2.7	29.5	55.8	12.0	4.9	72.9	1.5	6.5	2.2	7,240	13,030
	---	30.3	57.4	12.3	4.7	74.9	1.5	4.2	2.3	7,440	13,390
	---	34.5	65.5	---	5.4	85.5	1.7	4.8	2.6	8,490	15,280
R-8169	2.8	31.1	56.0	10.1	5.1	74.8	1.5	7.8	.6	7,340	13,210
	---	32.0	57.6	10.4	4.9	77.0	1.5	5.5	.6	7,550	13,590
	---	35.7	64.3	---	5.5	86.0	1.7	6.1	.7	8,430	15,180
R-8170	2.3	28.9	52.8	16.0	4.9	70.0	1.5	6.8	.8	7,020	12,630
	---	29.6	54.0	16.4	4.7	71.6	1.6	4.9	.8	7,180	12,930
	---	35.4	64.6	---	5.6	85.7	1.9	5.9	.9	8,590	15,460
R-8206	2.1	30.9	61.8	5.2	5.1	79.9	1.6	7.5	.7	7,820	14,080
	---	31.6	63.2	5.3	4.9	81.7	1.7	5.7	.7	7,990	14,380
	---	33.3	66.7	---	5.2	86.2	1.8	6.0	.8	8,440	15,190
R-8242	4.0	31.7	59.6	4.7	5.2	77.3	1.8	10.1	.8	7,540	13,580
	---	33.0	62.1	4.9	4.9	80.6	1.9	6.8	.9	7,860	14,150
	---	34.7	65.3	---	5.2	84.7	2.0	7.2	.9	8,270	14,880

TABLE 28.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	AIR-DRIED LOSS	FORMS OF SULFUR: SULFATE	PYRITIC	ORGANIC	FREE-SWELLING INDEX	ASH-FUSION TEMPERATURE, C: INITIAL DEFORMATION	SOFTENING	FLUID
R-7348	2.0	0.01	0.29	0.59	8.0	1,600G	1,600G	1,600G
	---	.01	.30	.61				
	---	.01	.33	.68				
R-7351	2.7	.02	.19	.62	8.0	1,390	1,445	1,505
	---	.02	.20	.65				
	---	.02	.21	.68				
R-7356	3.4	.01	.12	.46	8.0	1,540G	1,540G	1,540G
	---	.01	.12	.48				
	---	.01	.15	.56				
R-7357	2.5	.01	.13	.45	8.0	1,180	1,230	1,295
	---	.01	.13	.47				
	---	.01	.14	.48				
R-7358	2.7	.01	.16	.40	7.5	1,540G	1,540G	1,540G
	---	.01	.17	.41				
	---	.01	.20	.50				
R-7359	1.3	.01	.36	.52	7.5	1,540G	1,540G	1,540G
	---	.01	.37	.53				
	---	.01	.42	.60				
R-7380	2.8	.01	.24	.62	7.0	1,245	1,295	1,365
	---	.01	.25	.65				
	---	.01	.26	.67				
R-7381	2.9	.01	.17	.65	9.0	1,540G	1,540G	1,540G
	---	.01	.18	.68				
	---	.01	.19	.73				
R-7382	2.3	.01	.19	.72	9.0	1,540G	1,540G	1,540G
	---	.01	.20	.75				
	---	.01	.22	.85				
R-7465	2.3	.01	1.20	.38	8.0	1,330	1,395	1,440
	---	.01	1.25	.39				
	---	.01	1.33	.42				
R-7491	2.8	.02	.84	.46	9.0	1,395	1,440	1,490
	---	.02	.87	.48				
	---	.02	.94	.51				
R-7492	1.9	0.02	1.18	0.39	9.0	1,215	1,265	1,320
	---	.02	1.22	.40				
	---	.02	1.27	.42				
R-7493	2.8	.01	.43	.46	9.0	1,355	1,425	1,475
	---	.01	.45	.48				
	---	.01	.47	.50				
R-7545	1.2	.01	.10	.51	8.0	1,365	1,415	1,490
	---	.01	.10	.52				
	---	.01	.11	.56				
R-7546	2.2	.01	.15	.80	8.5	1,190	1,255	1,325
	---	.01	.16	.83				
	---	.01	.17	.91				
R-7547	7.5	.01	2.20	.43	8.0	1,095	1,160	1,220
	---	.01	2.41	.47				
	---	.01	2.64	.52				
R-7548	1.8	.01	.65	.45	7.0	1,400	1,470	1,520
	---	.01	.67	.46				
	---	.01	.77	.53				
R-7549	.9	.01	.06	.58	8.0	1,210	1,290	1,350
	---	.01	.06	.59				
	---	.01	.07	.65				
R-7550	.4	.01	.10	.65	8.0	1,165	1,215	1,300
	---	.01	.10	.66				
	---	.01	.11	.71				
R-7551	.6	.02	.54	.49	1.5	1,330	1,380	1,445
	---	.02	.55	.50				
	---	.04	1.12	1.02				
R-7552	1.1	.01	.28	.73	8.5	1,280	1,355	1,420
	---	.01	.29	.74				
	---	.01	.31	.82				
R-7553	.7	.14	1.03	.66	8.5	1,040	1,145	1,225
	---	.14	1.05	.67				
	---	.16	1.16	.75				
R-7554	1.7	.23	2.77	1.15	8.5	1,070	1,120	1,170
	---	.24	2.86	1.19				
	---	.26	3.08	1.28				

TABLE 28.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

		FORMS OF SULFUR				ASH-FUSION TEMPERATURE, C		
SAMPLE NUMBER	AIR-DRIED LOSS	SULFATE	PYRITIC	ORGANIC	FREE-SWELLING INDEX	INITIAL DEFORMATION	SOFTENING	FLUID
R-7555	1.0	0.10	0.23	0.81	7.5	1,300	1,360	1,410
	---	.10	.24	.83				
	---	.12	.27	.94				
R-7556	2.3	.01	.37	.55	6.5	1,295	1,365	1,410
	---	.01	.38	.57				
	---	.02	.58	.87				
R-7557	2.8	.19	.32	.62	8.5	1,170	1,240	1,330
	---	.20	.33	.65				
	---	.23	.39	.75				
R-7593	.7	.01	.22	.61	7.5	1,245	1,305	1,355
	---	.01	.22	.62				
	---	.01	.26	.73				
R-7594	2.2	.01	.13	.57	7.0	1,410	1,480	1,530
	---	.01	.13	.59				
	---	.01	.17	.76				
R-7595	1.3	.01	.07	.72	8.0	1,150	1,210	1,260
	---	.01	.07	.74				
	---	.01	.08	.80				
R-7596	.5	.01	1.91	.25	7.5	1,310	1,365	1,425
	---	.01	1.94	.25				
	---	.01	2.28	.30				
R-7597	2.6	.01	.09	.66	6.0	1,330	1,375	1,425
	---	.01	.09	.69				
	---	.01	.10	.74				
R-7860	1.5	.42	1.29	1.14	9.0	1,225	1,295	1,405
	---	.43	1.33	1.17				
	---	.49	1.49	1.32				
R-7861	.9	.03	.04	.53	9.0	1,425	1,470	1,510
	---	.03	.04	.54				
	---	.04	.05	.66				
R-7862	.6	.05	.24	.45	8.0	1,405	1,500	1,540G
	---	.05	.24	.46				
	---	.07	.32	.59				
R-7863	1.0	.02	.03	.45	8.0	1,375	1,465	1,540G
	---	.02	.03	.46				
	---	.03	.04	.61				
R-7864	0.7	0.05	0.10	0.40	7.5	1,515	1,540G	1,540G
	---	.05	.10	.41				
	---	.07	.14	.55				
R-7865	1.5	.24	.73	.48	8.0	1,305	1,415	1,540G
	---	.25	.75	.49				
	---	.35	1.07	.71				
R-7866	.9	.03	.04	.54	7.5	1,475	1,540G	1,540G
	---	.03	.04	.55				
	---	.04	.05	.66				
R-8167	.6	.07	.17	.55	8.5	1,275	1,330	1,470
	---	.07	.17	.56				
	---	.07	.18	.58				
R-8168	1.5	.26	1.16	.78	9.0	1,190	1,280	1,370
	---	.27	1.19	.80				
	---	.30	1.36	.91				
R-8169	1.6	.04	.03	.56	7.5	1,400	1,540G	1,540G
	---	.04	.03	.58				
	---	.05	.03	.64				
R-8170	1.1	.11	.16	.48	7.5	1,370	1,455	1,500
	---	.11	.16	.49				
	---	.13	.20	.59				
R-8206	.6	.01	.10	.61	3.5	1,540	1,540G	1,540G
	---	.01	.10	.62				
	---	.01	.11	.66				
R-8242	1.9	.09	.15	.60	7.5	1,225	1,375	1,445
	---	.09	.16	.63				
	---	.10	.16	.66				

TABLE 2C.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA.

[ALL ANALYSES EXCEPT KCAL/KG, BTU, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURES IN PERCENT. FOR EACH SAMPLE NUMBER, THE ANALYSES ARE REPORTED THREE WAYS; FIRST, AS-RECEIVED, SECOND, MOISTURE-FREE, AND THIRD, MOISTURE- AND ASH-FREE. ANALYSES BY COAL ANALYSIS SECTION, DEPARTMENT OF ENERGY, PITTSBURGH, PA. AND A COMMERCIAL TESTING LABORATORY FOLLOWING ASTM STANDARDS. G FOR ASH-FUSION TEMPERATURES MEANS GREATER THAN.]

	PROXIMATE ANALYSIS				ULTIMATE ANALYSIS					HEAT OF COMBUSTION	
SAMPLE NUMBER	MOISTURE	VOLATILE MATTER	FIXED CARBON	ASH	HYDROGEN	CARBON	NITROGEN	OXYGEN	SULFUR	KCAL/KG	BTU/LB
R-7324	3.0	34.2	53.9	8.9	5.2	73.8	1.3	8.0	2.8	7,440	13,390
	---	35.3	55.6	9.2	5.0	76.1	1.3	5.5	2.9	7,670	13,800
	---	38.8	61.2	---	5.5	83.8	1.5	6.1	3.2	8,440	15,200
R-7325	3.9	34.4	55.4	6.3	5.4	77.2	1.4	8.8	.9	7,630	13,730
	---	35.8	57.6	6.6	5.2	80.3	1.5	5.5	.9	7,940	14,290
	---	38.3	61.7	---	5.5	86.0	1.6	5.9	1.0	8,500	15,290
R-7341	2.5	33.1	53.8	10.6	5.2	73.3	1.5	5.3	4.2	7,410	13,330
	---	33.9	55.2	10.9	5.0	75.2	1.5	3.2	4.3	7,600	13,670
	---	38.1	61.9	---	5.7	84.3	1.7	3.5	4.8	8,520	15,340
R-7342	2.2	32.8	52.3	12.7	5.0	71.5	1.4	4.8	4.5	7,240	13,040
	---	33.5	53.5	13.0	4.9	73.1	1.4	2.9	4.6	7,410	13,330
	---	38.5	61.5	---	5.6	84.0	1.6	3.3	5.3	8,510	15,320
R-7343	3.8	33.4	51.8	11.0	5.4	72.5	1.4	8.8	.8	7,220	12,990
	---	34.7	53.8	11.4	5.2	75.4	1.5	5.6	.8	7,500	13,500
	---	39.2	60.8	---	5.8	85.1	1.6	6.4	.9	8,470	15,240
R-7344	2.7	36.9	57.4	3.0	5.7	80.1	1.5	8.7	1.0	7,990	14,390
	---	37.9	59.0	3.1	5.5	82.3	1.5	6.5	1.0	8,220	14,790
	---	39.1	60.9	---	5.7	84.9	1.6	6.7	1.1	8,480	15,260
R-7345	3.3	31.8	48.9	16.0	4.9	68.2	1.3	8.3	.8	6,740	12,130
	---	32.9	50.6	16.5	4.7	70.3	1.3	6.1	.8	6,970	12,540
	---	39.4	60.6	---	5.6	84.5	1.6	7.3	1.0	8,350	15,030
R-7346	3.6	21.4	64.2	10.8	5.1	73.7	1.4	8.0	.9	7,200	12,970
	---	22.2	66.6	11.2	4.9	76.5	1.5	5.0	.9	7,470	13,450
	---	25.0	75.0	---	5.5	86.1	1.6	5.6	1.1	8,420	15,150
R-7347	3.1	32.6	53.6	10.7	5.3	73.5	.4	8.2	2.0	7,330	13,200
	---	33.6	55.3	11.0	5.1	75.9	.4	5.6	2.1	7,570	13,620
	---	37.8	62.2	---	5.7	85.3	.5	6.3	2.3	8,510	15,310
R-7349	3.5	31.4	50.1	15.0	5.2	69.6	1.5	7.8	1.1	6,890	12,390
	---	32.5	51.9	15.5	5.0	72.1	1.6	4.9	1.1	7,130	12,840
	---	38.5	61.5	---	5.9	85.4	1.8	5.8	1.3	8,450	15,210
R-7350	2.6	33.0	51.8	12.6	5.1	73.0	1.4	7.0	.8	7,240	13,030
	---	33.9	53.2	12.9	4.9	74.9	1.4	4.3	.8	7,430	13,380
	---	38.9	61.1	---	5.7	86.1	1.7	5.5	.9	8,540	15,370
R-7354	2.7	31.3	61.3	4.7	5.3	80.2	1.6	7.4	0.8	7,940	14,280
	---	32.2	63.0	4.8	5.1	82.4	1.6	5.1	.8	8,160	14,680
	---	33.8	66.2	---	5.4	86.6	1.7	5.4	.9	8,570	15,430
R-7355	2.2	31.8	60.3	5.7	5.6	79.6	1.6	6.7	.9	7,890	14,200
	---	32.5	61.7	5.8	5.5	81.4	1.6	4.9	.9	8,070	14,520
	---	34.5	65.5	---	5.8	86.4	1.7	5.2	1.0	8,560	15,420
R-7366	3.5	33.5	55.2	6.8	5.2	76.3	1.6	9.5	.6	7,460	13,430
	---	34.7	58.2	7.0	5.0	79.1	1.7	6.6	.6	7,730	13,910
	---	37.3	62.7	---	5.4	85.1	1.8	7.1	.7	8,310	14,970
R-7367	2.2	34.5	56.5	6.8	5.3	77.6	1.6	8.0	.7	7,600	13,690
	---	35.3	57.8	7.0	5.2	79.3	1.6	6.2	.7	7,770	13,990
	---	37.9	62.1	---	5.6	85.3	1.8	6.6	.8	8,360	15,040
R-7406	2.0	32.3	49.6	16.1	4.9	69.3	1.5	7.4	.8	6,850	12,330
	---	33.0	50.6	16.4	4.9	70.7	1.5	5.7	.8	6,990	12,580
	---	37.4	60.6	---	5.7	84.6	1.8	6.9	1.0	8,360	15,050
R-7407	1.5	33.1	53.0	12.4	5.0	73.3	1.6	6.5	1.2	7,290	13,130
	---	33.6	53.8	12.6	4.9	74.4	1.6	5.2	1.2	7,400	13,330
	---	38.4	61.6	---	5.6	85.1	1.9	6.0	1.4	8,470	15,250
R-7408	3.4	34.3	53.1	9.2	5.4	74.1	1.4	9.3	.7	7,340	13,220
	---	35.5	55.0	9.5	5.2	76.7	1.4	6.5	.7	7,600	13,680
	---	39.2	60.8	---	5.7	84.8	1.6	7.2	.8	8,400	15,120
R-7409	2.3	37.9	55.3	4.5	5.1	79.2	1.6	9.1	.6	7,880	14,190
	---	38.8	56.6	4.6	5.0	81.1	1.6	7.2	.6	8,070	14,530
	---	40.7	59.3	---	5.2	85.0	1.7	7.6	.6	8,460	15,230
R-7410	2.3	36.3	51.4	10.0	5.0	73.6	1.5	9.1	.8	7,320	13,180
	---	37.2	52.6	10.2	4.9	75.3	1.5	7.2	.8	7,500	13,490
	---	41.4	58.6	---	5.4	83.9	1.7	8.0	.9	8,350	15,030
R-7411	2.2	35.9	53.2	8.7	5.4	75.0	1.7	8.3	.9	7,520	13,530
	---	36.7	54.4	8.9	5.3	76.7	1.7	6.5	.9	7,690	13,830
	---	40.3	59.7	---	5.8	84.2	1.9	7.1	1.0	8,440	15,180

TABLE 2C.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

	PROXIMATE ANALYSIS				ULTIMATE ANALYSIS					HEAT OF COMBUSTION	
SAMPLE NUMBER	MOISTURE	VOLATILE MATTER	FIXED CARBON	ASH	HYDROGEN	CARBON	NITROGEN	OXYGEN	SULFUR	KCAL/KG	BTU/LB
R-7412	2.9	34.6	57.5	5.0	5.4	78.9	1.6	8.5	.6	7,760	13,970
	---	35.6	59.2	5.1	5.2	81.3	1.6	6.1	.6	7,990	14,390
	---	37.6	62.4	---	5.5	85.7	1.7	6.4	.7	8,430	15,170
R-7515	3.9	34.8	55.8	5.5	5.5	77.0	1.5	9.5	1.1	7,640	13,760
	---	36.2	58.1	5.7	5.3	80.1	1.6	6.3	1.1	7,950	14,320
	---	38.4	61.6	---	5.6	85.0	1.7	6.7	1.2	8,440	15,190
R-7516	3.0	33.8	57.3	5.9	5.3	75.5	1.5	11.2	0.6	7,740	13,940
	---	34.8	59.1	6.1	5.1	77.8	1.5	8.8	.6	7,980	14,370
	---	37.1	62.9	---	5.5	82.9	1.6	9.4	.7	8,500	15,300
R-7517	4.2	28.0	47.9	19.9	4.7	64.0	1.2	9.4	.8	6,300	11,350
	---	29.2	50.0	20.8	4.4	66.8	1.3	5.9	.8	6,580	11,840
	---	36.9	63.1	---	5.5	84.3	1.6	7.5	1.1	8,300	14,950
R-7518	2.5	35.2	55.0	7.3	5.4	76.9	1.5	8.2	.7	7,670	13,800
	---	36.1	56.4	7.5	5.3	78.9	1.5	6.1	.7	7,860	14,150
	---	39.0	61.0	---	5.7	85.3	1.7	6.6	.8	8,500	15,300
R-7519	2.4	33.4	58.1	6.1	6.3	78.7	1.6	7.7	.6	7,750	13,960
	---	34.2	59.5	6.2	6.2	80.6	1.6	5.7	.6	7,940	14,300
	---	36.5	63.5	---	6.6	86.0	1.7	6.1	.7	8,470	15,250
R-7520	3.3	35.0	57.2	4.5	5.5	78.3	1.5	9.2	1.0	7,850	14,130
	---	36.2	59.2	4.7	5.3	81.0	1.6	6.5	1.0	8,120	14,610
	---	38.0	62.0	---	5.6	84.9	1.6	6.8	1.1	8,510	15,320
R-8165	1.9	31.5	54.5	12.1	4.9	73.1	1.6	7.3	.9	7,200	12,970
	---	32.1	55.6	12.3	4.8	74.5	1.7	5.7	.9	7,340	13,220
	---	36.6	63.4	---	5.5	85.0	1.9	6.5	1.0	8,370	15,070
R-8166	2.1	34.2	51.8	11.8	5.1	72.7	1.7	7.3	1.3	7,200	12,970
	---	35.0	52.9	12.1	5.0	74.3	1.7	5.6	1.3	7,360	13,240
	---	39.8	60.2	---	5.7	84.5	2.0	6.3	1.5	8,370	15,070
R-8207	1.7	33.8	55.4	9.2	5.1	76.4	1.4	6.8	1.1	7,570	13,620
	---	34.3	56.3	9.3	5.0	77.7	1.4	5.4	1.1	7,700	13,860
	---	37.9	62.1	---	5.6	85.7	1.5	5.9	1.3	8,490	15,280
R-8208	2.2	28.5	53.5	15.7	4.6	70.1	1.2	7.7	.7	6,910	12,430
	---	29.2	54.8	16.1	4.4	71.7	1.2	5.9	.7	7,060	12,710
	---	34.7	65.3	---	5.3	85.4	1.5	7.0	.8	8,420	15,150
R-8209	2.5	36.2	56.2	5.1	5.3	77.7	1.7	8.2	2.0	7,780	14,000
	---	37.2	57.6	5.2	5.2	79.7	1.8	6.2	2.0	7,980	14,360
	---	39.2	60.8	---	5.4	84.1	1.9	6.5	2.1	8,410	15,140
R-8210	1.8	31.6	52.6	13.9	4.7	71.8	1.6	7.3	.7	7,090	12,770
	---	32.2	53.6	14.2	4.6	73.2	1.6	5.8	.7	7,230	13,010
	---	37.6	62.4	---	5.3	85.2	1.9	6.7	.8	8,420	15,150
R-8241	2.4	30.3	63.1	4.3	5.2	80.8	1.6	7.4	.7	7,990	14,390
	---	31.0	64.6	4.4	5.0	82.7	1.7	5.4	.7	8,190	14,740
	---	32.4	67.6	---	5.3	86.5	1.7	5.7	.8	8,570	15,420
R-8243	2.6	31.4	53.5	12.5	4.9	72.2	1.7	6.1	2.5	7,160	12,890
	---	32.2	54.9	12.9	4.8	74.1	1.8	3.9	2.5	7,350	13,230
	---	37.0	63.0	---	5.5	85.1	2.0	4.5	2.9	8,430	15,180
R-8244	1.8	30.2	53.5	14.4	4.8	70.4	1.7	5.3	3.4	7,060	12,710
	---	30.8	54.5	14.7	4.7	71.7	1.7	3.8	3.4	7,190	12,940
	---	36.1	63.9	---	5.5	84.1	2.0	4.5	4.0	8,430	15,170

TABLE 2C.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	AIR-DRIED LOSS	FORMS OF SULFUR: SULFATE	PYRITIC	ORGANIC	FREE SWELLING INDEX	ASH FUSION TEMPERATURE, C: INITIAL DEFORMATION	SOFTENING	FLUID
R-7324	1.5	0.02	1.65	1.15	8.5	1,140	1,260	1,305
	---	.02	1.70	1.19				
	---	.02	1.87	1.31				
R-7325	2.3	.01	.31	.62	8.5	1,165	1,195	1,305
	---	.01	.32	.65				
	---	.01	.35	.69				
R-7341	1.6	.01	2.54	1.62	8.5	1,075	1,145	1,180
	---	.01	2.61	1.66				
	---	.01	2.92	1.86				
R-7342	1.2	.01	3.02	1.50	8.0	1,110	1,175	1,270
	---	.01	3.09	1.53				
	---	.01	3.55	1.76				
R-7343	2.2	.01	.16	.64	8.0	1,600G	1,600G	1,600G
	---	.01	.17	.67				
	---	.01	.19	.75				
R-7344	.9	.01	.21	.79	8.0	1,320	1,380	1,430
	---	.01	.22	.81				
	---	.01	.22	.84				
R-7345	1.5	.01	.23	.61	6.5	1,600G	1,600G	1,600G
	---	.01	.24	.63				
	---	.01	.29	.76				
R-7346	2.2	.05	.19	.70	6.5	1,325	1,375	1,425
	---	.05	.20	.73				
	---	.06	.22	.82				
R-7347	1.9	.01	1.09	.90	3.5	1,350	1,400	1,450
	---	.01	1.12	.93				
	---	.01	1.26	1.04				
R-7349	2.0	.01	.35	.71	8.5	1,320	1,380	1,440
	---	.01	.36	.74				
	---	.01	.43	.87				
R-7350	1.1	.01	.20	.63	8.5	1,405	1,455	1,515
	---	.01	.21	.65				
	---	.01	.24	.74				
R-7354	1.6	0.01	0.22	0.57	9.0	1,455	1,515	1,540G
	---	.01	.23	.59				
	---	.01	.24	.62				
R-7355	1.2	.01	.33	.55	9.0	1,290	1,350	1,405
	---	.01	.34	.56				
	---	.01	.36	.60				
R-7366	1.8	.01	.13	.43	4.5	1,430	1,495	1,540G
	---	.01	.13	.45				
	---	.01	.14	.48				
R-7367	.7	.01	.16	.50	5.0	1,540G	1,540G	1,540G
	---	.01	.16	.51				
	---	.01	.18	.55				
R-7406	.8	.01	.20	.53	6.0	1,495	1,540G	1,540G
	---	.01	.20	.59				
	---	.01	.24	.71				
R-7407	.4	.02	.48	.74	6.0	1,455	1,515	1,540G
	---	.02	.49	.75				
	---	.02	.56	.86				
R-7408	1.8	.01	.10	.57	5.5	1,505	1,540G	1,540G
	---	.01	.10	.59				
	---	.01	.11	.65				
R-7409	.6	.05	.06	.50	6.0	1,490	1,540G	1,540G
	---	.05	.06	.51				
	---	.05	.06	.54				
R-7410	.7	.02	.08	.65	4.5	1,510	1,540G	1,540G
	---	.02	.08	.63				
	---	.02	.09	.75				
R-7411	.6	.01	.14	.76	5.5	1,540G	1,540G	1,540G
	---	.01	.14	.78				
	---	.01	.16	.85				

TABLE 2C.--PROXIMATE AND ULTIMATE ANALYSES, HEAT CONTENT, FORMS OF SULFUR, FREE-SWELLING INDEX AND ASH-FUSION TEMPERATURE DETERMINATIONS FOR 37 BTIUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	AIR-DRIED LOSS	FORMS OF SULFUR: SULFATE	PYRITIC	ORGANIC	FREE SWELLING INDEX	ASH FUSION TEMPERATURE, C: INITIAL DEFORMATION	SOFTENING	FLUID
R-7412	.9	.01	.12	.52	5.0	1,540G	1,540G	1,540G
	---	.01	.12	.54				
	---	.01	.13	.56				
R-7515	2.3	.02	.61	.45	9.0	1,405	1,455	1,515
	---	.02	.63	.50				
R-7516	1.5	0.01	0.20	0.40	9.0	1,510	1,540G	1,540G
	---	.01	.21	.41				
	---	.01	.22	.44				
R-7517	2.8	.01	.33	.48	5.5	1,540G	1,540G	1,540G
	---	.01	.34	.50				
	---	.01	.43	.63				
R-7518	1.1	.01	.31	.40	8.0	1,540G	1,540G	1,540G
	---	.01	.32	.41				
	---	.01	.34	.44				
R-7519	.8	.01	.23	.35	7.5	1,525	1,540G	1,540G
	---	.01	.24	.36				
	---	.01	.25	.38				
R-7520	1.8	.01	.62	.42	8.5	1,225	1,325	1,370
	---	.01	.64	.43				
	---	.01	.67	.46				
R-8165	.5	.04	.14	.72	5.0	1,480	1,540G	1,540G
	---	.04	.14	.73				
	---	.05	.16	.84				
R-8166	.8	.11	.11	.60	7.0	1,425	1,480	1,520
	---	.11	.11	.61				
	---	.13	.13	.70				
R-8207	.5	.05	.26	.81	8.0	1,540G	1,540G	1,540G
	---	.05	.26	.82				
	---	.06	.29	.91				
R-8208	.8	.07	.12	.47	8.0	1,500	1,540G	1,540G
	---	.07	.12	.48				
	---	.09	.15	.57				
R-8209	1.0	.10	1.11	.75	5.5	1,105	1,155	1,225
	---	.10	1.14	.77				
	---	.11	1.20	.81				
R-8210	.4	.04	.14	.53	6.5	1,510	1,540G	1,540G
	---	.04	.14	.54				
	---	.05	.17	.63				
R-8241	1.2	.03	.12	.57	8.5	1,450	1,540G	1,540G
	---	.03	.12	.58				
	---	.03	.13	.61				
R-8243	1.3	0.20	1.35	0.92	8.0	1,220	1,300	1,425
	---	.21	1.39	.94				
	---	.24	1.59	1.08				
R-8244	.8	.25	2.12	1.01	6.5	1,140	1,215	1,295
	---	.25	2.16	1.03				
	---	.30	2.53	1.21				

TABLE 3A.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 2 BITUMINOUS COAL SAMPLES FROM BUCHANAN COUNTY, VIRGINIA.

[VALUES IN PERCENT OR PARTS-PER-MILLION. COAL ASHED AT 525 C. L MEANS LESS THAN THE VALUE SHOWN; B, NOT DETERMINED; S AFTER ELEMENT TITLE INDICATES DETERMINATIONS BY AUTOMATIC PLATE READING COMPUTER ASSISTED, EMISSION SPECTOGRAPHIC ANALYSES. THE STANDARD DEVIATION OF ANY SINGLE ANSWER SHOULD BE TAKEN AS PLUS 50% AND MINUS 35%. METHODS OF ANALYSES FOR OTHER ELEMENTS AS SHOWN IN FIGURE 6.

SAMPLE NUMBER	ASH (PERCENT)	SIO2 (PERCENT)	AL2O3 (PERCENT)	CAO (PERCENT)	MGO (PERCENT)	NA2O (PERCENT)	K2O (PERCENT)	FE2O3 (PERCENT)	TIO2 (PERCENT)	P2O5 (PERCENT)	SAMPLE NUMBER
R-7383	26.4	59	26	0.74	0.78	0.20	1.8	3.1	2.0	0.38	R-7383
R-7494	6.9	51	36	.98	.69	.85	2.2	3.8	2.0	.07L	R-7494

SAMPLE NUMBER	SO3 (PERCENT)	AG-S (PPM)	B-S (PPM)	BA-S (PPM)	BE-S (PPM)	CD (PPM)	CE (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	SAMPLE NUMBER
R-7383	0.25	0.10L	84	790	6.0	0.28	160	37	160	8.7	R-7383
R-7494	.02L	.30	140	880	51	.58	260	77	200	14	R-7494

SAMPLE NUMBER	CU (PPM)	ER-S (PPM)	EU (PPM)	GA-S (PPM)	GE-S (PPM)	HF (PPM)	LA (PPM)	LI (PPM)	LU (PPM)	MN (PPM)	SAMPLE NUMBER
R-7383	74	10L	2.1	44	3.0	9.1	95	670	1.1	48	R-7383
R-7494	280	10	4.5	52	21	10	72	230	1.4	56	R-7494

SAMPLE NUMBER	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	PB (PPM)	RB (PPM)	SC (PPM)	SM (PPM)	SN-S (PPM)	SR-S (PPM)	SAMPLE NUMBER
R-7383	4.0	33	49	71	61	110	32	11	13	1,300	R-7383
R-7494	4.0	36	140	130	89	230L	41	22	11	1,600	R-7494

SAMPLE NUMBER	TA (PPM)	TB (PPM)	TH (PPM)	U (PPM)	V-S (PPM)	W-S (PPM)	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)	SAMPLE NUMBER
R-7383	0.20L	1.9	34	11	150	0.4	29	6.1	34	160	R-7383
R-7494	.20	2.7	39	10	220	.6	64	8.7	27	230	R-7494

TABLE 3B.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA.

[VALUES IN PERCENT OR PARTS-PER-MILLION. COAL ASHED AT 525 C. L MEANS LESS THAN THE VALUE SHOWN; H, NOT ENOUGH SAMPLE; B, NOT DETERMINED; S AFTER ELEMENT TITLE INDICATES DETERMINATIONS BY AUTOMATIC PLATE READING COMPUTER ASSISTED, EMISSION SPECTOGRAPHIC ANALYSES. THE STANDARD DEVIATION OF ANY SINGLE ANSWER SHOULD BE TAKEN AS PLUS 50% AND MINUS 35%. METHODS OF ANALYSES FOR OTHER ELEMENTS AS SHOWN IN FIGURE 6.

SAMPLE NUMBER	ASH (PERCENT)	SIO2 (PERCENT)	AL2O3 (PERCENT)	CAO (PERCENT)	MGO (PERCENT)	NA2O (PERCENT)	K2O (PERCENT)	FE2O3 (PERCENT)	TIO2 (PERCENT)	P2O5 (PERCENT)	SO3 (PERCENT)	AG-S (PPM)	B-S (PPM)	BA-S (PPM)	BE-S (PPM)	SAMPLE NUMBER
R-7348	11.8	54	31	0.78	0.88	0.23	2.7	6.4	1.2	0.05L	1.2	0.10	80	620	19	R-7348
R-7351	4.7	47	30	2.3	.51	1.3	.94	11	2.6	.13	2.4	.60	500	1,100	15	R-7351
R-7356	14.1	56	26	.89	.73	.81	1.8	3.2	2.1	.23	1.0	.20	120	1,100	10	R-7356
R-7357	4.5	39	25	3.9	1.5	.96	2.6	11	1.4	.49	7.0	.30	140	2,100	21	R-7357
R-7358	12.0	50	28	1.8	.99	.43	2.5	6.0	1.1	.13	2.8	.30	85	1,100	29	R-7358
R-7359	8.7	54	26	.85	.98	.54	1.4	8.5	1.9	.17	1.0	.60	140	1,100	38	R-7359
R-7380	3.3	43	29	2.7	.83	.81	1.9	9.9	1.6	1.0	3.5	1.2	290	1,200	51	R-7380
R-7381	7.4	54	34	.83	.50	.16	1.8	2.8	1.1	.07L	.75	.70	180	570	34	R-7381
R-7382	12.1	51	35	.53	.95	.32	4.1	3.0	1.0	.04L	.50	.40	150	700	45	R-7382
R-7465	6.8	45	27	1.0	.50	.19	1.1	20	1.7	.07L	.27	.50	130	1,400	33	R-7465
R-7491	8.8	62	22	.88	.33	.27	.78	10	3.5	.22	.02L	.40	150	590	33	R-7491
R-7492	3.7	36	24	1.8	.60	.93	1.3	27	1.2	.54	1.3	.70	200	1,000	57	R-7492
R-7493	5.8	52	29	1.2	.93	.69	2.8	8.3	1.6	.09L	.32	.50	110	770	63	R-7493
R-7545	6.4	46	29	2.3	1.6	.89	1.8	8.1	1.1	.16L	2.1	.20	220	1,700	23	R-7545
R-7546	7.4	42	25	1.6	.98	.47	2.6	18	1.1	.20	1.7	.20	150	970	25	R-7546
R-7547	7.6	29	20	1.4	.38	.13	1.2	40	1.1	1.1	1.6	.90	130	910	46	R-7547
R-7548	14.0	46	30	1.3	1.4	.34	4.2	7.1	1.3	.08	1.7	6.5	130	1,200	7.0	R-7548
R-7549	9.2	47	27	2.1	2.0	.63	3.9	7.7	1.3	.11L	2.1	.20	190	1,500	12	R-7549
R-7550	7.1	50	25	4.3	.99	.12	.89	9.2	1.9	.10	2.9	.30	130	780	14	R-7550
R-7551	54.4	56	25	.32	2.0	.20	5.0	6.6	1.1	.01L	1.2	.10	150	850	7.0	R-7551
R-7552	12.3	49	26	2.0	1.2	.46	3.4	9.5	1.5	.01L	2.7	.30	140	1,200	12	R-7552
R-7553	11.9	44	20	2.8	1.4	.53	3.2	18	1.3	.01L	4.2	.40	160	1,100	6.0	R-7553
R-7554	14.5	46	26	2.7	1.5	.38	3.1	10	1.2	.02	3.8	.40	180	1,100	8.0	R-7554
R-7555	13.3	49	27	1.3	1.6	.42	3.7	9.8	1.4	.01L	2.4	.40	150	1,200	9.0	R-7555
R-7556	36.2	54	25	2.0	1.8	.35	4.4	6.6	1.0	.02	1.9	.10L	140	900	8.0	R-7556
R-7557	6.7	22	14	1.5	.40	.08	1.0	51	.89	.01L	2.4	.80	200	790	34	R-7557
R-7593	18.5	51	26	2.1	1.6	.27	4.2	8.0	1.3	.01L	2.2	.10	140	830	10	R-7593
R-7594	26.1	56	24	.80	1.6	.28	4.1	7.0	1.1	.04	1.3	.10L	140	1,300	7.0	R-7594
R-7595	7.5	46	25	5.2	1.7	.90	1.5	8.4	1.8	.04	3.1	.30	250	1,400	9.0	R-7595
R-7596	11.1	32	22	2.2	.75	.12	.62	34	.68	.01L	3.1	.40	22	660	42	R-7596
R-7597	6.4	48	23	4.8	1.7	.81	.68	9.3	1.9	.09	3.3	.20	230	1,800	14	R-7597
R-7860	15.3	41	23	.67	1.1	.44	4.2	23	.95	.07L	2.0	.20	110	1,000	10	R-7860
R-7861	21.5	52	28	5.5	.86	.16	2.2	2.5	1.9	.26	1.7	.19	70	600	8.2	R-7861
R-7862	24.5	70	19	.39	.88	.18	2.4	3.5	2.6	.04L	.82	.18	93	550	6.5	R-7862
R-7863	27.5	53	28	1.6	1.8	.44	4.1	5.2	1.2	.04L	1.7	.14	120	930	7.9	R-7863
R-7864	28.7	58	28	.55	.93	.22	3.4	3.4	2.3	.09	.93	.14	86	640	8.5	R-7864
R-7865	32.2	52	25	.34	1.8	.22	5.2	10	1.0	1.2	1.3	.14	93	650	8.6	R-7865
R-7866	17.1	60	26	.87	1.0	.44	2.7	3.3	1.7	.06L	1.3	.11	120	900	10	R-7866
R-8167	3.1	40	29	3.5	1.1	.75	2.5	14	1.4	.32L	3.8	.61	240	1,900	24	R-8167
R-8168	12.5	53	19	.49	1.2	.30	3.1	19	.63	.08L	1.1	.16	69	1,900	20	R-8168
R-8169	12.9	57	29	0.70	0.81	0.57	3.4	3.2	1.5	0.21	0.50	0.17	180	930	10	R-8169
R-8170	16.5	58	27	.56	1.0	.43	4.2	4.7	1.4	.07	.60	.15	160	850	8.6	R-8170
R-8206	4.5	49	31	2.3	.56	.44	1.0	6.2	2.6	4.0	2.5	.52	210	1,600	52	R-8206
R-8242	4.8	44	26	1.9	.83	1.1	1.5	15	2.2	3.3	2.2	.46	220	1,500	20	R-8242

TABLE 3B.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	BR (PPM)	CD (PPM)	CE (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	CU (PPM)	DY-S (PPM)	ER-S (PPM)	EU (PPM)	GA-S (PPM)	GD-S (PPM)	GE-S (PPM)	HF (PPM)	LA (PPM)	SAMPLE NUMBER
R-7348	B	0.77	200	40	91	11	180	22L	10L	2.9	59	15L	5.0	8.5	110	R-7348
R-3511	B	1.1	340	57	190	4.3	310	22L	15	5.5	53	17	3.0	15	190	R-7351
R-7356	B	.50	230	33	170	7.1	140	22L	10L	3.3	44	15L	2.0L	11	130	R-7356
R-7357	B	.98	240	140	160	8.9	300	22L	10L	4.9	48	15L	6.0	8.9	130	R-7357
R-7358	B	.66	180	93	94	8.3	140	22L	10L	2.8	55	15L	3.0	14	92	R-7358
R-7359	B	1.1	340	160	200	3.4	360	22L	10L	6.1	48	15L	23	13	200	R-7359
R-7380	B	3.1	360	180	210	9.1	520	22L	15	6.7	59	20	66	9.1	180	R-7380
R-7381	B	.78	190	210	170	6.8	310	33	14	4.2	67	15L	48	6.8	95	R-7381
R-7382	B	1.2	190	78	180	15	220	22L	16	3.6	58	15L	78	5.0	91	R-7382
R-7465	B	.84	280	250	170	8.8	350	22L	12	4.3	39	39	22	10	160	R-7465
R-7491	B	.78	260	91	170	3.4	270	22L	17	5.2	34	29	14	17	140	R-7491
R-7492	B	1.6	300	340	160	11	420	22L	29	6.8	47	33	49	8.1	160	R-7492
R-7493	B	1.1	190	81	160	14	270	22L	21	3.4	33	15L	15	8.6	52	R-7493
R-7545	B	.25	230	64	97	4.7	150	22L	20	4.4	50	21	4.0	11	130	R-7545
R-7546	B	.92	190	78	140	14	230	22L	15	4.9	44	16	3.0	5.4	95	R-7546
R-7547	B	2.3	290	190	180	3.9	220	22L	10L	5.7	79	15L	130	5.3	140	R-7547
R-7548	B	.55	160	36	140	14	140	24	16	3.2	44	21	2.0L	5.7	93	R-7548
R-7549	B	.56	200	78	140	9.8	200	22L	10L	4.0	45	15L	3.0	5.4	110	R-7549
R-7550	B	.77	250	63	160	2.8	200	22L	10L	5.2	31	16	5.0	8.5	150	R-7550
R-7551	B	.35	130	24	100	13	65	22L	10L	2.3	38	15L	2.0L	5.1	74	R-7551
R-7552	B	.80	140	55	120	9.8	140	22L	10L	3.4	51	15L	4.0	6.5	89	R-7552
R-7553	B	.50	130	18	120	17	78	22L	10L	2.2	41	15L	4.0	7.6	76	R-7553
R-7554	B	.69	120	36	130	10	150	22L	10L	2.3	38	26	2.0L	5.5	69	R-7554
R-7555	B	.89	140	25	100	13	150	22L	10L	2.7	43	15L	2.0	5.3	83	R-7555
R-7556	B	.57	130	30	110	15	76	22L	10L	2.3	38	21	3.0	5.8	72	R-7556
R-7557	B	.81	75	33	75	3.0	130	22L	10L	1.9	59	16	190	4.5	45	R-7557
R-7593	B	.62	140	28	110	16	120	22L	10L	2.8	37	20	3.0	5.4	92	R-7593
R-7594	B	.44	140	35	110	11	74	22L	10L	2.5	41	18	2.0	6.5	88	R-7594
R-7595	B	1.1	160	39	130	5.3	160	22L	10L	3.1	42	15L	2.0	8.0	110	R-7595
R-7596	B	.25	130	87	41	1.8	82	22L	10L	2.2	61	15L	3.0	9.9	72	R-7596
R-7597	B	.65	170	23	110	4.7	180	22L	10L	3.1	40	49	4.0	9.4	130	R-7597
R-7860	29	.58	100	21	92	17	72	22L	10L	1.8	28	15L	1.5L	3.3	59	R-7860
R-7861	87	.14	230	77	220	6.5	120	22L	10L	4.0	40	15L	3.5	7.9	120	R-7861
R-7862	82	.10L	190	22	130	9.0	110	22L	10L	2.9	33	15L	1.5L	13	110	R-7862
R-7863	31	.24	110	21	93	16	80	22L	10L	2.1	34	15L	1.5L	3.6	62	R-7863
R-7864	97	.30	160	24	150	10	100	22L	10L	2.1	39	15L	3.5L	7.7	94	R-7864
R-7865	54	.10L	130	27	100	14	80	22L	10L	2.3	35	15L	5.6	3.7	75	R-7865
R-7866	33	.14	160	28	130	15	79	22L	10L	2.4	29	15L	2.5	7.0	94	R-7866
R-8167	B	1.0	230	150	170	19	240	22L	10L	5.9	31	15L	12	6.5	130	R-8167
R-8168	B	.71	110	62	92	16	160	22L	10L	2.8	30	15L	23	3.2	64	R-8168
R-8169	B	0.30	160	33	110	11	150	22L	10L	3.3	34	15L	12	7.0	100	R-8169
R-8170	B	.35	160	28	110	11	110	22L	10L	2.9	34	15L	8.7	6.7	97	R-8170
R-8206	170	.51	330	180	230	4.4	300	22L	10L	5.8	50	15L	59	13	200	R-8206
R-8242	63	1.6	250	100	240	6.3	230	22L	10L	5.6	58	15L	10	15L	150	R-8242

TABLE 3B.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	LI (PPM)	LU (PPM)	MN (PPM)	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	PB (PPM)	PD-S (PPM)	PR-S (PPM)	RB (PPM)	SC (PPM)	SM (PPM)	SN-S (PPM)	SR-S (PPM)	SAMPLE NUMBER
R-7348	270	1.7	260	15	33	98	94	160	2.0L	68L	140	30	18	15	580	R-7348
R-7351	200	2.1	80	27	48	170	140	87	2.0L	68L	430L	43	30	4.0	3,200L	R-7351
R-7356	200	1.4	64	9.0	30	120	85	74	2.0L	68L	160	34	18	8.0	1,100	R-7356
R-7357	150	1.7	1,000	38	55	130	340	76	1.0L	68L	440L	42	20	2.0L	3,900	R-7357
R-7358	180	1.7	120	9.0	23	54	120	140	2.0L	68L	140	27	19	6.0	1,900	R-7358
R-7359	210	2.3	30	11	22	100	230	120	2.0L	68L	340L	63	31	2.0L	1,500	R-7359
R-7380	170	3.0	82	67	33	150	300	120	1.0L	68L	300L	58	30	7.0	3,400	R-7380
R-7381	230	1.4	51	23	36	140	230	160	1.0L	68L	81	45	19	10	790	R-7381
R-7382	290	1.7	75	10	21	110	140	97	1.0L	68L	190	46	18	10	430	R-7382
R-7465	190	1.5	64	33	45	170	330	67	1.0L	120	290L	34	22	2.0L	1,400	R-7465
R-7491	140	3.4	39	28	73	200	160	72	1.0L	77	280L	41	26	14	1,500	R-7491
R-7492	93	2.7	180	36	19	210	370	63	1.0	120	680L	43	35	2.0	2,800	R-7492
R-7493	150	1.7L	98	22	24	110	140	52	1.0L	68L	34L	34	1.7L	2.0	1,200	R-7493
R-7545	200	1.6	340	14	38	140	150	160	1.0L	68L	780L	30	23	12	3,000	R-7545
R-7546	95	1.4	1,600	36	21	160	140	37	1.0L	78	680L	32	16	2.0L	2,000	R-7546
R-7547	71	2.6	92	41	19	180	280	60	1.0L	68L	530L	49	25	H	2,900	R-7547
R-7548	210	1.4	160	13	14	110	88	60	1.0L	68L	320L	30	15	4.0	1,400	R-7548
R-7549	130	2.2	200	11	9	32L	88	57	1.0L	68L	490L	32	20	3.0	1,700	R-7549
R-7550	230	1.4	310	21	36	120	150	62	1.0L	68L	280L	38	20	2.0	3,000	R-7550
R-7551	220	.7	220	1.0L	15	41	70	30	1.0L	68L	210	24	10	2.0	340	R-7551
R-7552	190	1.6	390	21	16	32L	110	60	1.0L	68L	160	33	13	5.0	1,600	R-7552
R-7553	150	.8	180	5.0	21	32L	56	26	1.0L	68L	260	26	9.2	2.0L	1,600	R-7553
R-7554	280	.7	200	9.0	19	32L	42	65	1.0L	68L	190	25	10	3.0	1,400	R-7554
R-7555	220	.8	180	15	23	70	82	59	1.0L	68L	140	26	11	2.0	1,400	R-7555
R-7556	140	.8	340	3.0	22	33	86	37	1.0L	68L	220	26	10	3.0	630	R-7556
R-7557	71	1.5	170	21	21	41	100	90	1.0L	68L	300L	33	7.5	H	900	R-7557
R-7593	220	1.1	270	6.0	17	32L	76	44	1.0L	68L	190	26	12	6.0	930	R-7593
R-7594	150	.8	320	6.0	20	60	92	37	1.0L	68L	280	26	11	4.0	1,200	R-7594
R-7595	210	1.3	700	16	17	36	120	58	1.0L	68L	400L	28	15	7.0	2,400	R-7595
R-7596	290	.9	320	23	47	32	160	150	1.0L	89	180L	14	14	H	1,400	R-7596
R-7597	150	1.6	900	13	18	32L	73	46	1.0L	68L	310L	31	16	2.0L	2,200	R-7597
R-7860	62	.7	120	6.9	7	36	47	55	1.0L	68L	130	21	7.8	1.5L	850	R-7860
R-7861	120	1.3	110	10	34	54	130	58	1.0L	68L	230L	32	16	12	1,200	R-7861
R-7862	100	1.5	68	1.5	25	90	50	73	1.0L	68L	90	26	14	10	330	R-7862
R-7863	100	.7	130	1.0L	15	57	59	80	1.0L	68L	110	21	9.1	4.7	770	R-7863
R-7864	130	1.0	54	2.0	32	66	47	53	1.0L	68L	130	32	10	8.8	630	R-7864
R-7865	88	.8	130	4.0	15	68	69	59	1.0L	68L	200	25	11	1.5L	320	R-7865
R-7866	94	.9	46	2.8	33	73	67	50	1.0L	68L	150	28	11	6.5	1,200	R-7866
R-8167	140	1.6	170	43	35	110	160	43	1.0L	150L	1,100L	45	19	1.5L	3,800	R-8167
R-8168	91	1.4	170	16	5	32L	130	26	1.0L	68L	280L	31	9.6	1.5L	560	R-8168
R-8169	410	0.9	60	6.7	23	76	76	53	1.0L	68L	390L	30	13	7.2	1,100	R-8169
R-8170	290	1.3	94	2.5	14	50	56	46	1.0L	68L	360L	31	9.7	1.9	800	R-8170
R-8206	210	2.0	160	11	51	76	440	89	1.0L	79	560L	56	24	9.8	1,900	R-8206
R-8242	140	2.2	220	19	10	74	140	63	2.0L	68L	830L	49	21	1.5L	2,200	R-8242

TABLE 38.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	TA (PPM)	TB (PPM)	TH (PPM)	TL-S (PPM)	U (PPM)	V-S (PPM)	W-S (PPM)	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)	SAMPLE NUMBER
R-7348	0.54	2.5	67	3.0L	35	180	1.1	83	7.6	80	230	R-7348
R-7351	.19	4.3	49	3.0L	21	230	.4	130	13	69	310	R-7351
R-7356	.38	2.8	35	3.0L	11	180	.7	64	8.5	45	180	R-7356
R-7357	.08	4.4	33	3.0L	11	180	.8L	93	13	63	90	R-7357
R-7358	.45	3.3	59	3.0L	30	130	.9	74	10	110	110	R-7358
R-7359	.28	4.6	47	3.0L	21	240	.4	86	14	110	150	R-7359
R-7380	.16	6.1	36	5.0L	18	310	.4	140	18	160	260	R-7380
R-7381	.72	4.1	31	5.0L	23	330	.9	110	11	120	290	R-7381
R-7382	.18	3.3	33	5.0L	26	340	.4	74	9.1	170	170	R-7382
R-7465	.22	2.9	37	5.0L	12	180	.4	86	10	170	370	R-7465
R-7491	.48	4.5	41	11	16	210	.8	120	18	68	520	R-7491
R-7492	.30L	5.4	27	5.0L	14	200	.4	160	19	220	230	R-7492
R-7493	.17	3.4	28	5.0L	8.6	200	.6	64	1.7L	77	150	R-7493
R-7545	.27	6.3	83	5.0L	61	140	.5	84	11	48	230	R-7545
R-7546	.14	4.1	23	5.0L	12	200	.4	86	9.5	140	170	R-7546
R-7547	.05	7.9	22	5.0L	9.2	170	.3	90	16	190	190	R-7547
R-7548	.29	2.9	26	5.0L	14	210	.4	45	7.1	120	110	R-7548
R-7549	.20	4.3	26	5.0L	12	150	.4	32	11	57	100	R-7549
R-7550	.27	1.4	39	5.0L	8.5	190	.4	77	11	110	310	R-7550
R-7551	1.0	1.8	19	5.0L	7.4	160	1.3	31	5.7	170	91	R-7551
R-7552	.28	3.3	25	5.0L	11	170	.7	34	9.8	120	110	R-7552
R-7553	.28	1.7	20	5.0L	7.6	98	.5	27	6.7	82	120	R-7553
R-7554	.37	1.4	20	5.0L	10	140	.8	21	5.5	80	94	R-7554
R-7555	.26	2.3	22	5.0L	14	210	.6	43	6.0	160	180	R-7555
R-7556	.69	2.2	21	5.0L	8.8	190	1.1	40	5.8	170	180	R-7556
R-7557	.12	1.5	12	5.0L	4.5	110	.3	43	7.5	65	120	R-7557
R-7593	.33	2.2	23	5.0L	10	160	.7	31	7.0	110	97	R-7593
R-7594	.50	2.3	21	5.0L	7.7	140	.8	29	6.5	99	99	R-7594
R-7595	.25	2.7	31	5.0L	13	140	.4	39	8.0	100	210	R-7595
R-7596	.75	.90L	68	5.0L	39	69	1.2	58	7.2	53	220	R-7596
R-7597	.19	3.1	31	5.0L	14	140	.6	37	9.4	33	180	R-7597
R-7860	.20	.26	15	4.6L	5.8	120	.3	25	3.9	86	96	R-7860
R-7861	.59	4.2	34	4.6L	14	180	.8	69	7.9	81	330	R-7861
R-7862	.90	4.0	36	4.6L	12	140	1.2	47	9.0	44	230	R-7862
R-7863	.37	2.7	16	4.6L	10	180	.6	38	4.7	28	100	R-7863
R-7864	.87	2.5	32	4.6L	11	170	1.0	47	5.9	110	280	R-7864
R-7865	.44	3.1	19	8.5	14	200	1.1	42	5.6	53	150	R-7865
R-7866	.44	3.2	25	4.6L	9.4	170	.5	52	5.8	100	260	R-7866
R-8167	.07	4.2	29	4.6L	15	200	.3	100	16	53	330	R-8167
R-8168	.16	2.2	18	4.6L	18	170	.7	41	8.0	340	78	R-8168
R-8169	0.26	1.9	26	4.6L	11	160	0.6	45	7.0	35	160	R-8169
R-8170	.50	1.9	27	4.6L	9.6	140	.5	33	6.1	45	100	R-8170
R-8206	.20	4.2	51	4.6L	27	280	.4	83	13	53	380	R-8206
R-8242	.19	4.8	38	4.6L	18	260	.2	120	13	180	400	R-8242

TABLE 3C.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA.

[VALUES IN PERCENT OR PARTS-PER-MILLION. COAL ASHED AT 525 C. L MEANS LESS THAN THE VALUE SHOWN; B, NOT DETERMINED; S AFTER ELEMENT TITLE INDICATES DETERMINATIONS BY AUTOMATIC PLATE READING COMPUTER ASSISTED, EMISSION SPECTOGRAPHIC ANALYSES. THE STANDARD DEVIATION OF ANY SINGLE ANSWER SHOULD BE TAKEN AS PLUS 50% AND MINUS 35%. METHODS OF ANALYSES FOR OTHER ELEMENTS AS SHOWN IN FIGURE 6.]

SAMPLE NUMBER	ASH (PERCENT)	SIO2 (PERCENT)	AL2O3 (PERCENT)	CAO (PERCENT)	MGO (PERCENT)	NA2O (PERCENT)	K2O (PERCENT)	FE2O3 (PERCENT)	TIO2 (PERCENT)	P2O5 (PERCENT)	SO3 (PERCENT)	AG-S (PPM)	B-S (PPM)	BA-S (PPM)	SAMPLE NUMBER
R-7324	8.4	32	22	1.7	0.90	0.40	2.7	31	0.89	0.10	3.4	0.40	110	1,000	R-7324
R-7325	7.0	43	24	3.6	1.7	.38	2.1	14	1.3	.07	5.6	.60	150	1,200	R-7325
R-7341	9.9	31	18	1.0	.38	.10	1.4	49	1.0	.66	1.7	.50	44	480	R-7341
R-7342	12.9	29	18	.59	.58	.11	1.9	42	.96	.52	1.1	.40	37	420	R-7342
R-7343	16.0	57	29	.45	1.3	.19	3.9	4.8	1.4	.05	.90	.20	98	670	R-7343
R-7344	3.0	33	32	3.9	1.2	.35	1.8	20	1.3	.03L	7.0	.30	500	2,100	R-7344
R-7345	9.3	52	29	.86	1.2	.15	3.3	6.8	1.2	.05L	1.5	.20	190	720	R-7345
R-7346	10.3	50	26	3.3	1.0	.13	.82	9.3	1.8	.66	5.0	.20	160	580	R-7346
R-7347	11.7	50	27	.50	.78	.23	2.8	15	1.5	.05	.90	.20	58	610	R-7347
R-7349	14.4	56	25	1.0	1.4	.23	3.1	9.0	1.1	.13	1.9	.20	110	700	R-7349
R-7350	11.7	55	26	1.6	1.2	.35	4.1	7.8	1.2	.05L	2.8	.40	110	940	R-7350
R-7354	4.8	49	27	1.9	.83	.35	2.4	8.2	1.4	1.3	2.5	.50	150	750	R-7354
R-7355	5.5	52	26	1.6	.71	.39	2.5	6.6	1.7	.84	2.3	.40	140	760	R-7355
R-7366	8.3	50	33	2.7	.66	.19	1.4	2.7	1.4	.08	1.3	.30	140	580	R-7366
R-7367	7.5	52	32	1.3	1.1	.28	1.6	4.8	1.6	.15	1.3	.30	120	460	R-7367
R-7406	15.3	56	26	1.9	.88	.31	1.9	4.4	1.3	.54	2.0	.20	140	790	R-7406
R-7407	13.7	53	24	2.2	.80	.38	1.9	9.6	1.7	.67	2.3	.20	110	630	R-7407
R-7408	11.9	51	30	.97	1.4	.39	4.4	5.3	1.1	.04L	1.5	.30	160	1,200	R-7408
R-7409	4.5	52	27	2.3	.90	.66	.82	5.8	2.6	.11L	3.0	.40	340	1,300	R-7409
R-7410	10.1	55	26	2.8	.91	.27	2.2	3.9	1.7	.32	2.3	.40	140	820	R-7410
R-7411	9.2	51	33	1.4	.76	.32	2.1	4.1	2.0	.49	1.0	.40	140	660	R-7411
R-7412	5.1	48	31	2.7	.78	.19	1.4	6.7	1.5	1.4	2.0	.30	150	540	R-7412
R-7515	5.4	44	32	1.0	1.1	.43	4.1	13	1.0	.19L	1.4	.30	220	710	R-7515
R-7516	5.3	49	32	1.3	1.5	.65	3.9	6.9	1.2	.19L	2.1	.30	290	1,100	R-7516
R-7517	22.6	55	28	.60	1.5	.19	3.1	8.1	1.4	.04L	1.3	.10L	110	700	R-7517
R-7518	7.8	47	36	.84	.78	.58	3.5	4.8	1.6	.13L	1.0	.30	270	1,200	R-7518
R-7519	11.0	67	21	.95	.53	.84	1.0	3.4	2.0	.09L	.88	.10	280	1,100	R-7519
R-7520	4.2	47	29	2.0	.90	.94	2.2	9.4	1.5	.24L	2.6	.40	330	1,600	R-7520
R-8165	12.2	53	32	2.9	.40	.26	.89	3.5	2.1	1.9	.60	.16	140	630	R-8165
R-8166	12.3	52	31	.49	.83	.43	3.3	7.9	1.6	.08L	.47	.37	190	770	R-8166
R-8207	13.8	55	29	.45	.95	.46	3.8	6.1	1.3	1.5	.88	.26	170	920	R-8207
R-8208	11.1	56	28	1.1	.91	.36	3.5	5.0	1.4	.14	1.7	.10L	170	1,000	R-8208
R-8209	5.6	40	21	3.0	.43	.49	.85	26	1.5	1.8	1.9	.83	300	1,200	R-8209
R-8210	17.6	56	30	.34	1.2	.43	4.2	4.1	1.2	.06	.82	.15	240	850	R-8210
R-8241	5.2	54	29	.94	.60	.81	2.0	8.5	1.7	.19L	1.3	.57	170	820	R-8241
R-8243	10.3	39	25	.63	1.0	.53	4.0	26	.92	.10L	1.4	.36	140	1,100	R-8243
R-8244	14.2	45	22	.60	.75	.36	2.6	26	.99	.32	1.3	.37	100	590	R-8244

TABLE 3C.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	BE-S (PPM)	BR (PPM)	CD (PPM)	CE (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	CU (PPM)	ER-S (PPM)	EU (PPM)	GA-S (PPM)	GD-S (PPM)	GE-S (PPM)	SAMPLE NUMBER
R-7324	11	B	0.88	120	64	120	15	170	10L	2.6	46	15L	30	R-7324
R-7325	24	B	1.2	170	190	130	16	310	10L	3.6	46	20	5.0	R-7325
R-7341	19	B	1.3	150	95	110	7.1	230	10L	2.9	46	22	35	R-7341
R-7342	19	B	1.3	160	96	110	7.8	210	10L	3.0	42	21	47	R-7342
R-7343	7.0	B	.36	140	21	130	16	84	10L	2.4	39	15L	2.0L	R-7343
R-7344	46	B	2.1	370	130	210	3.3	510	22	7.3	92	33	24	R-7344
R-7345	11	B	.54	170	48	130	14	110	10L	3.0	41	15	2.0	R-7345
R-7346	13	B	.62	200	40	130	4.9	190	15	3.0	48	15L	4.0	R-7346
R-7347	29	B	.78	140	29	130	15	120	10L	2.6	50	15L	8.0	R-7347
R-7349	15	B	.62	150	45	110	13	170	10L	2.7	43	15	13	R-7349
R-7350	30	B	1.3	160	160	130	17	340	14	4.0	52	18	12	R-7350
R-7354	31	B	1.5	190	150	180	13	370	10L	3.8	56	15L	27	R-7354
R-7355	23	B	1.4	200	140	160	15	270	10L	3.6	43	15L	14	R-7355
R-7366	21	B	.90	240	55	120	3.6	190	10L	3.3	64	15L	12	R-7366
R-7367	17	B	1.3	270	140	140	4.0	210	10L	4.0	53	15L	26	R-7367
R-7406	9.0	B	.43	180	53	150	8.5	140	10L	2.7	52	15L	6.0	R-7406
R-7407	9.0	B	.49	180	27	130	8.0	130	10L	2.8	50	15L	5.0	R-7407
R-7408	7.0	B	.59	180	48	130	16	210	10L	3.2	53	15L	2.0	R-7408
R-7409	24	B	1.1	360	80	180	2.2	280	17	4.9	42	15L	5.0	R-7409
R-7410	15	B	.75	240	56	180	15	160	16	4.2	53	15L	51	R-7410
R-7411	18	B	.89	210	43	180	14	210	10L	3.7	62	15L	6.0	R-7411
R-7412	21	B	.90	290	35	140	3.9	310	16	4.5	45	15L	8.0	R-7412
R-7515	87	B	2.4	200	280	180	22	340	13	5.2	67	15L	23	R-7515
R-7516	9.0	B	.85	210	83	120	17	190	10L	3.8	32	15L	2.0L	R-7516
R-7517	6.0	B	.25	140	16	130	17	60	10L	2.1	30	15L	2.0L	R-7517
R-7518	5.0	B	.71	240	29	190	7.7	250	10L	3.7	44	15L	2.0L	R-7518
R-7519	7.0	B	.58	180	15	120	3.6	140	10L	2.7	26	25	2.0L	R-7519
R-7520	21	B	.59	310	100	180	12	240	10L	5.5	42	15L	9.0	R-7520
R-8165	13	B	.64	300	17	160	3.3	160	10L	3.9	32	15L	8.2	R-8165
R-8166	15	B	.46	160	67	130	11	200	10L	3.0	34	15L	6.5	R-8166
R-8207	19	65	.74	140	41	140	14	140	10L	3.3	47	15L	11	R-8207
R-8208	30	82	.31	180	37	150	19	88	10L	3.9	50	15L	4.0	R-8208
R-8209	11	75	1.1	200	45	120	3.6	200	10L	3.4	50	15L	5.8	R-8209
R-8210	8.0	36	.32	170	16	140	13	80	11	3.0	49	15L	4.2	R-8210
R-8241	24	58	3.2	170	63	140	9.6	170	10	4.2	40	15L	2.7	R-8241
R-8243	12	39L	.66	130	27	120	15	130	10L	2.5	49	18	57	R-8243
R-8244	9.6	32	.38	110	23	97	7.7	92	10L	2.0	44	15L	23	R-8244

TABLE 3c.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	HF (PPM)	LA (PPM)	LI (PPM)	LU (PPM)	MN (PPM)	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	PB (PPM)	PD-S (PPM)	PR-S (PPM)	RB (PPM)	SAMPLE NUMBER
R-7324	4.8	71	150	1.2	180	21	12	66	90	29	2.0L	87	190	R-7324
R-7325	7.1	86	130	1.4	160	46	26	110	250	43	2.0L	74	430L	R-7325
R-7341	5.1	81	130	1.0	120	44	19	81	170	31	2.0L	68L	150	R-7341
R-7342	4.7	85	130	1.6	95	33	18	81	160	39	2.0L	68L	100	R-7342
R-7343	6.3	75	160	.6	120	7.0	21	97	58	41	2.0L	68L	240	R-7343
R-7344	13	200	250	3.3	220	63	20	170	330	86	2.0L	68L	670L	R-7344
R-7345	6.5	86	190	1.1	150	13	20	110	94	35	2.0L	68L	240	R-7345
R-7346	9.7	140	480	1.0	280	20	34	76	110	70	2.0L	68L	190L	R-7346
R-7347	6.8	77	190	.9	100	4.0	23	82	59	49	2.0L	68L	200	R-7347
R-7349	5.6	83	160	1.4	160	9.0	15	100	110	55	2.0L	68L	200	R-7349
R-7350	6.8	85	140	2.6	150	17	16	120	150	76	2.0L	68L	210	R-7350
R-7354	8.3	100	60	2.1	80	27	13	110	190	71	2.0L	68L	190	R-7354
R-7355	9.1	110	120	1.8	53	20	15	79	140	50	2.0L	68L	160	R-7355
R-7366	11	130	280	1.2	36	5.0	22	68	150	100	2.0L	68L	96	R-7366
R-7367	9.3	160	220	1.3	76	3.0	16	96	220	93	2.0L	68L	270L	R-7367
R-7406	7.8	110	390	1.3	82	4.0	26	53	92	73	1.0L	68L	140	R-7406
R-7407	7.3	100	380	1.5	130	11	22	32L	68	66	1.0L	68L	140	R-7407
R-7408	5.0	92	130	.8	170	16	15	94	100	91	1.0L	68L	290	R-7408
R-7409	13	200	190	2.2	71	20	71	180	200	94	1.0L	68L	440L	R-7409
R-7410	8.9	130	180	2.0	190	10	39	120	110	80	1.0L	68L	170	R-7410
R-7411	8.7	130	400	1.1	100	5.0	34	110	98	99	1.0L	68L	110	R-7411
R-7412	9.8	160	290	2.0	70	13	45	170	96	110	1.0L	68L	390L	R-7412
R-7515	5.6	93	100	3.7	110	30	9	65	210	89	1.0	68L	370	R-7515
R-7516	3.8	94	99	1.9	230	18	6	68	97	47	1.0L	68L	750L	R-7516
R-7517	6.2	71	99	.9	2,000	5.0	19	55	46	28	1.0L	68L	270	R-7517
R-7518	6.4	130	200	1.3	37	20	10	67	80	75	1.0L	68L	260	R-7518
R-7519	10	110	140	.9	32	6.0	28	110	62	53	1.0L	68L	450L	R-7519
R-7520	7.1	170	140	2.4	59	27	19	86	130	48	1.0L	68L	950L	R-7520
R-8165	9.0	130	450	1.1	68	10	54	76	63	83	1.0L	68L	330L	R-8165
R-8166	6.5	98	190	1.1	61	4.4	26	110	97	63	1.0L	68L	330L	R-8166
R-8207	4.3	80	150	.9	78	3.5	27	80	89	58	1.0L	68L	200	R-8207
R-8208	6.3	90	120	1.0	390	9.1	22	100	79	34	1.0L	68L	170	R-8208
R-8209	7.1	110	130	1.1	120	6.8L	20	75	140	53	1.0L	94	540L	R-8209
R-8210	5.1	100	200	.9	97	2.5	12	95	64	33	1.0L	68L	180	R-8210
R-8241	9.6	96	140	1.3	39	42	48	130	150	43	1.0L	68L	580	R-8241
R-8243	6.8L	68	130	.9	110	4.1	8	32	62	38	1.0L	68L	150	R-8243
R-8244	3.5	63	210	.8	170	11	42	73	22L	30	80	5L	92	R-8244

3C.--MAJOR AND MINOR OXIDE AND TRACE ELEMENT COMPOSITION OF THE LABORATORY ASH OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	SC (PPM)	SM (PPM)	SN-S (PPM)	SR-S (PPM)	TA (PPM)	TB (PPM)	TH (PPM)	TL-S (PPM)	U (PPM)	V-S (PPM)	W-S (PPM)	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)	SAMPLE NUMBER
R-7324	36	12	4.0	990	0.10	1.2	18	3.0L	7.1	110	0.5	45	7.1	100	80	R-7324
R-7325	31	17	2.0L	3,900	.09	2.9	21	3.0L	19	260	.4	110	8.6	400	250	R-7325
R-7341	28	15	3.0	1,400	.14	2.0	17	3.0L	13	150	.4	83	8.1	170	190	R-7341
R-7342	26	16	2.0L	960	.17	2.3	16	3.0L	15	150	.6	69	7.8	190	140	R-7342
R-7343	26	11	8.0	460	.26	1.9	18	3.0L	6.9	180	.5	52	5.6	91	190	R-7343
R-7344	47	33	4.0	7,000	.06	6.7	43	3.0L	27	490	.3	180	17	130	190	R-7344
R-7345	27	14	2.0	840	.16	2.2	19	3.0L	5.4	220	.4	76	6.5	85	190	R-7345
R-7346	32	13	3.0	3,700	.25	1.9	34	3.0L	13	230	.7	98	7.8	55	340	R-7346
R-7347	30	12	2.0L	570	.21	1.7	20	3.0L	8.5	160	.7	60	6.0	46	220	R-7347
R-7349	27	14	2.0L	960	.20	2.1	19	3.0L	13	230	.6	72	6.3	100	140	R-7349
R-7350	50	18	4.0	1,300	.20	3.4	23	3.0L	15	270	1.3	140	15	220	120	R-7350
R-7354	46	21	2.0L	1,700	.20L	2.1	21	3.0L	29	260	.5	82	10	200	94	R-7354
R-7355	36	16	2.0L	1,500	.14	3.6	24	3.0L	9.1	170	1.3	69	9.1	90	100	R-7355
R-7366	36	20	9.0	1,100	.21	3.6	41	3.0L	16	170	.9L	85	9.6	55	190	R-7366
R-7367	32	23	3.0	920	.20	4.0	33	3.0L	15	160	.9L	75	9.3	110	140	R-7367
R-7406	30	14	4.0	1,600	.39	2.0	30	5.0L	11	170	9	37	5.2	49	170	R-7406
R-7407	30	14	4.0	1,600	.36	2.2	28	5.0L	11	160	8	29	6.6	47	110	R-7407
R-7408	31	16	4.0	1,300	.18	2.5	29	5.0L	18	210	9	51	6.7	90	110	R-7408
R-7409	40	29	6.0	3,100	.17	4.4	51	5.0L	22	180	8	140	16	76	560	R-7409
R-7410	40	21	6.0	1,500	.22	3.0	36	5.0	12	250	8	110	9.9	200	350	R-7410
R-7411	41	18	8.0	940	.25	3.3	39	5.0L	18	240	9	65	9.9	91	210	R-7411
R-7412	31	27	7.0	1,000	.14	3.9	41	5.0L	18	180	9	140	12	51	550	R-7412
R-7515	69	24	3.0	740	.07	3.7	30	51	26	200	1.4	70	24	73	49	R-7515
R-7516	28	19	2.0	1,500	.06	1.9	19	5.0L	11	150	.3	25	7.5	63	48	R-7516
R-7517	25	10	3.0	430	.37	1.3	19	5.0L	5.3	130	.6	23	5.3	100	170	R-7517
R-7518	36	21	5.0	1,300	.15	2.6	36	5.0L	18	200	.4	25	7.7	60	73	R-7518
R-7519	25	15	11	1,300	.31	1.8	31	5.0L	4.5	120	.8L	49	7.3	30	220	R-7519
R-7520	50	29	5.0	3,500	.11	4.8	36	5.0L	12	190	.7L	73	14	69	160	R-7520
R-8165	41	18	11	1,600	.41	2.8	32	4.6L	18	170	.6	75	8.2	30	410	R-8165
R-8166	32	13	3.8	800	.23	2.0	26	4.6L	13	210	.4	67	8.1	93	240	R-8166
R-8207	34	12	1.6	1,100	.22	2.0	22	4.6L	8.3	250	.9	47	7.2	78	180	R-8207
R-8208	31	14	3.8	1,000	.23	2.9	23	4.6L	7.9	210	.5	50	7.2	66	210	R-8208
R-8209	33	13	1.5L	2,700	.12	2.5	27	4.6L	16	180	.3	59	7.1	96	190	R-8209
R-8210	27	13	3.3	670	.33	2.2	25	6.1	9.7	220	.4	42	6.3	90	110	R-8210
R-8241	30	15	4.2	1,300	.12	4.4	21	34	6.2	220	.7	100	9.6	45	420	R-8241
R-8243	32	9.7	1.5L	460	.15	1.8	20	4.6L	13	140	.5	24	6.8	65	74	R-8243
R-8244	21	8.5	1.5L	970	.18	1.5	18	4.6L	12	150	.7	19	4.2	89	82	R-8244

TABLE 4A.--CONTENT OF 23 TRACE ELEMENTS IN 2 BITUMINOUS COAL SAMPLES FROM BUCHANAN COUNTY, VIRGINIA.

[ANALYSIS PERFORMED ON WHOLE-COAL. VALUES IN PARTS-PER-MILLION (PPM). L, LESS THAN THE VALUE SHOWN; B, NOT DETERMINED.

SAMPLE NUMBER	AS (PPM)	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	EU (PPM)	F (PPM)	HF (PPM)	HG (PPM)	SAMPLE NUMBER
R-7383	4.0	43	150	9.8	42	2.3	0.55	120	2.4	0.020	R-7383
R-7494	1.0	18	1,100	5.3	14	1.0	.31	70	.7	.19	R-7494

SAMPLE NUMBER	LA (PPM)	LU (PPM)	NA (PPM)	P (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SE (PPM)	SM (PPM)	TB (PPM)	SAMPLE NUMBER
R-7383	25	0.3	400	440	28	0.70	8.5	B	3.0	0.5	R-7383
R-7494	5	.1	430	22L	16L	.80	2.8	3.1	1.5	.2	R-7494

SAMPLE NUMBER	TH (PPM)	U (PPM)	YB (PPM)
R-7383	9.0	2.8	1.6
R-7494	2.7	.70	.6

TABLE 4B.--CONTENT OF 23 TRACE ELEMENTS IN 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA.

[ANALYSIS PERFORMED ON WHOLE-COAL. VALUES IN PARTS-PER-MILLION (PPM). L, LESS THAN THE VALUE SHOWN; B, NOT DETERMINED.]

SAMPLE NUMBER	AS (PPM)	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	EU (PPM)	F (PPM)	HF (PPM)	HG (PPM)	LA (PPM)	LU (PPM)	SAMPLE NUMBER
R-7348	7.0	24	240	4.7	11	1.3	0.34	56	1.0	0.070	13	0.2	R-7348
R-7351	3.0	16	280	2.7	8.8	.2	.26	48	.7	.030	9	.1	R-7351
R-7356	2.0	32	420	4.7	24	1.0	.46	260	1.6	.030	19	.2	R-7356
R-7357	2.0	11	50L	6.5	7.4	.4	.22	510	.4	.010L	6	.1	R-7357
R-7358	6.0	22	60	11	11	1.0	.34	210	1.7	.030	11	.2	R-7358
R-7359	4.0	30	350	14	18	.3	.53	560	1.1	.12	17	.2	R-7359
R-7380	6.0	12	430	6.0	7.0	.3	.22	57	.3	.010L	6	.1	R-7380
R-7381	1.0	14	230	16	12	.5	.31	35	.5	.010L	7	.1	R-7381
R-7382	2.0	23	200	9.4	22	1.8	.43	95	.6	.020	11	.2	R-7382
R-7465	17.0	19	200	17	12	.6	.29	60	.7	.17	11	.1	R-7465
R-7491	6.0	23	350	8.0	15	.3	.46	90	1.5	.20	12	.3	R-7491
R-7492	13.0	11	650	13	6.0	.4	.25	50	.3	.11	6	.1	R-7492
R-7493	.1L	11	360	4.7	9.1	.8	.20	70	.5	.10	3	.1L	R-7493
R-7545	2.0	15	130	4.1	6.2	.3	.28	60	.7	.080	8	.1	R-7545
R-7546	29.0	14	190	5.8	10	1.0	.36	60	.4	.13	7	.1	R-7546
R-7547	68.0	22	520	15	14	.3	.43	70	.4	.25	11	.2	R-7547
R-7548	4.0	22	260	5.1	20	2.0	.45	180	.8	.35	13	.2	R-7548
R-7549	3.5	18	100L	7.2	13	.9	.37	70	.5	.16	10	.2	R-7549
R-7550	8.0	18	720	4.5	12	.2	.37	40	.6	.070	11	.1	R-7550
R-7551	36.0	70	100L	13	57	7.0	1.3	120	2.8	.14	40	.4	R-7551
R-7552	6.0	17	100L	6.8	15	1.2	.42	40	.8	.050	11	.2	R-7552
R-7553	12.0	15	100L	2.2	14	2.0	.26	30	.9	.060	9	.1	R-7553
R-7554	6.0	17	100L	5.2	19	1.5	.34	10	.8	.050	10	.1	R-7554
R-7555	16.0	18	200	3.3	14	1.7	.36	60	.7	.050	11	.1	R-7555
R-7556	19.0	46	100L	11	40	5.4	.85	80	2.1	.050	26	.3	R-7556
R-7557	106	5.0	100L	2.2	5.0	.2	.13	10L	.3	.15	3	.1	R-7557
R-7593	23.0	26	300	5.2	21	3.0	.51	60	1.0	.070	17	.2	R-7593
R-7594	5.0	37	100L	9.2	28	2.9	.65	70	1.7	.090	23	.2	R-7594
R-7595	5.0	12	210	2.9	9.8	.4	.23	40	.6	.050	8	.1	R-7595
R-7596	59.0	14	210	9.7	4.6	.2	.24	10	1.1	.18	8	.1	R-7596
R-7597	4.0	11	240	1.5	7.3	.3	.20	10	.6	.070	8	.1	R-7597
R-7860	123	16	290	3.2	14	2.6	.27	260	.5	.37	9	.1	R-7860
R-7861	1.5	49	490	17	47	1.4	.86	170	1.7	.12	26	.3	R-7861
R-7862	7.2	47	480	5.5	31	2.2	.71	150	3.1	.50	27	.4	R-7862
R-7863	2.7	31	230	5.8	26	4.4	.59	260	1.0	.37	17	.2	R-7863
R-7864	11.2	45	530	6.9	43	3.0	.61	210	2.2	.41	27	.3	R-7864
R-7865	64.1	43	350	8.7	33	4.5	.73	230	1.2	.37	24	.3	R-7865
R-7866	1.5	27	100L	4.8	22	2.6	.41	150	1.2	.18	16	.2	R-7866
R-8167	5.6	7.0	510	4.6	5.3	.6	.18	100	.2	.058	4	.1	R-8167
R-8168	40.0	14	550	7.8	12	2.0	.35	90	.4	.068	8	.2	R-8168
R-8169	2.8	21	1,400	4.2	15	1.4	0.42	100	0.9	0.14	13	0.1	R-8169
R-8170	2.8	27	1,200	4.7	19	1.8	.48	90	1.1	.058	16	.2	R-8170
R-8206	1.5	15	520	8.3	10	.2	.26	30	.6	.10	9	.1	R-8206
R-8242	9.1	12	170	4.9	11	.3	.27	30	.7L	.17	7	.1	R-8242

TABLE 48.--CONTENT OF 23 TRACE ELEMENTS IN 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	NA (PPM)	P (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SE (PPM)	SM (PPM)	TB (PPM)	TH (PPM)	U (PPM)	YB (PPM)	SAMPLE NUMBER
R-7348	200	26L	17	1.2	3.5	4.2	2.1	0.3	7.9	4.1	0.9	R-7348
R-7351	460	26	20L	.30	2.0	2.1	1.4	.2	2.3	1.0	.6	R-7351
R-7356	850	140	22	.40	4.8	2.0L	2.6	.4	5.0	1.6	1.2	R-7356
R-7357	320	96	20L	.40	1.9	5.2	.90	.2	1.5	.50	.6	R-7357
R-7358	380	70	17	.60	3.2	2.6	2.3	.4	7.1	3.6	1.2	R-7358
R-7359	350	66	30L	.80	5.5	7.4	2.7	.4	4.1	1.8	1.2	R-7359
R-7380	200	150	10L	.70	1.9	1.5	1.0	.2	1.2	.60	.6	R-7380
R-7381	89	22L	6	.90	3.3	5.2	1.4	.3	2.3	1.7	.8	R-7381
R-7382	290	22L	23	1.7	5.6	4.2	2.2	.4	4.0	3.1	1.1	R-7382
R-7465	95	22L	20L	1.1	2.3	5.3	1.5	.2	2.5	.80	.7	R-7465
R-7491	180	83	25L	.90	3.6	2.5	2.3	.4	3.6	1.4	1.6	R-7491
R-7492	260	87	25L	.70	1.6	1.3	1.3	.2	1.0	.50	.7	R-7492
R-7493	300	22L	2L	.90	2.0	1.3	.10L	.2	1.6	.50	.1L	R-7493
R-7545	420	44L	50L	.40	1.9	3.4	1.5	.4	5.3	3.9	.7	R-7545
R-7546	260	66	50L	.70	2.4	1.8	1.2	.3	1.7	.90	.7	R-7546
R-7547	76	370	40L	1.8	3.7	1.9	1.9	.6	1.7	.70	1.2	R-7547
R-7548	350	48	45L	.60	4.2	3.0	2.1	.4	3.7	1.9	1.0	R-7548
R-7549	430	44L	45L	.60	2.9	5.6	1.8	.4	2.4	1.1	1.0	R-7549
R-7550	64	31	20L	.60	2.7	2.4	1.4	.1	2.8	.60	.8	R-7550
R-7551	820	22L	120	1.7	13	1.7	5.5	1	10	4.0	3.1	R-7551
R-7552	420	4L	20	1.2	4.1	3.5	1.6	.4	3.1	1.3	1.2	R-7552
R-7553	460	4L	31	1.2	3.1	4.4	1.1	.2	2.4	.90	.8	R-7553
R-7554	410	13	27	2.9	3.6	2.8	1.5	.2	2.9	1.5	.8	R-7554
R-7555	410	4L	19	1.5	3.4	2.7	1.5	.3	2.9	1.9	.8	R-7555
R-7556	940	31	80	1.9	9.3	3.2	3.8	.8	7.6	3.2	2.1	R-7556
R-7557	40	4L	20L	5.9	2.2	7.0	.50	.1	.8	.30	.5	R-7557
R-7593	370	9L	35	2.4	4.9	2.8	2.2	.4	4.3	1.9	1.3	R-7593
R-7594	550	44	74	.60	6.7	3.2	2.8	.6	5.6	2.0	1.7	R-7594
R-7595	500	13	30L	.80	2.1	2.1	1.1	.2	2.3	1.0	.6	R-7595
R-7596	100	4L	20L	.60	1.6	3.5	1.5	.1L	7.5	4.3	.8	R-7596
R-7597	380	26	20L	1.1	2.0	1.7	1.0	.2	2.0	.90	.6	R-7597
R-7860	500	48L	20	.50L	3.2	7.1	1.2	.0	2.3	.89	.6	R-7860
R-7861	260	240	50L	1.0L	7.0	5.1	3.4	.9	7.4	3.0	1.7	R-7861
R-7862	320	44L	22	3.2	6.3	4.5	3.5	1	8.7	2.9	2.2	R-7862
R-7863	910	48L	30	1.0L	5.8	2.7	2.5	.7	5.0	2.8	1.3	R-7863
R-7864	460	110	38	1.0	9.1	4.8	2.9	.7	9.2	3.0	1.7	R-7864
R-7865	510	1,700	66	2.0	8.0	2.6	3.5	1	6.2	4.4	1.8	R-7865
R-7866	560	44L	26	1.0	4.7	2.0	1.9	.5	4.3	1.6	1.0	R-7866
R-8167	170	44L	35L	.80	1.4	3.1	.60	.1	.9	.46	.5	R-8167
R-8168	270	44L	35L	1.8	3.9	1.8	1.2	.3	2.2	2.3	1.0	R-8168
R-8169	540	120	50L	0.90	3.9	2.6	1.7	0.3	3.3	1.4	0.9	R-8169
R-8170	530	52	60L	.80	5.1	2.5	1.6	.3	4.4	1.6	1.0	R-8170
R-8206	150	790	25L	1.0L	2.5	3.0	1.1	.2	2.3	1.2	.6	R-8206
R-8242	370	700	40L	1.0L	2.4	3.1	1.0	.2	1.8	.84	.6	R-8242

TABLE 4C.--CONTENT OF 23 TRACE ELEMENTS IN 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA.

[ANALYSIS PERFORMED ON WHOLE-COAL. VALUES IN PARTS-PER-MILLION (PPM). L, LESS THAN THE VALUE SHOWN; B, NOT DETERMINED.]

SAMPLE NUMBER	AS (PPM)	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	EU (PPM)	F (PPM)	HF (PPM)	HG (PPM)	LA (PPM)	LU (PPM)	SAMPLE NUMBER
R-7324	55.0	10	140	5.4	9.8	1.3	0.22	76	0.4	0.17	6	0.1	R-7324
R-7325	8.0	12	480	13	9.3	1.1	.25	45	.5	.030	6	.1	R-7325
R-7341	62.0	15	260	9.4	11	.7	.29	24	.5	.39	8	.1	R-7341
R-7342	95.0	20	240	12	14	1.0	.39	43	.6	.39	11	.2	R-7342
R-7343	3.0	22	50L	3.4	20	2.6	.38	120	1.0	.020	12	.1	R-7343
R-7344	8.0	11	150	4.0	6.2	.1	.22	20L	.4	.10	6	.1	R-7344
R-7345	4.0	16	110	4.5	12	1.3	.28	88	.6	.030	8	.1	R-7345
R-7346	8.0	21	1,700	4.1	14	.5	.31	48	1.0	.13	14	.1	R-7346
R-7347	32.0	16	510	3.4	15	1.8	.31	80	.8	.12	9	.1	R-7347
R-7349	9.0	22	290	6.5	16	1.9	.39	46	.8	.030	12	.2	R-7349
R-7350	18.0	19	450	18	15	2.0	.47	84	.8	.080	10	.3	R-7350
R-7354	4.0	9.0	180	7.0	8.7	.6	.18	220	.4	.080	5	.1	R-7354
R-7355	8.0	11	80	7.7	8.7	.8	.20	350	.5	.020	6	.1	R-7355
R-7366	2.0	20	1,700	4.6	9.6	.3	.27	140	.9	.070	11	.1	R-7366
R-7367	2.0	20	370	10	10	.3	.30	48	.7	.030	12	.1	R-7367
R-7406	3.0	27	70	5.1	23	1.3	.41	77	1.2	.060	17	.2	R-7406
R-7407	24.1	24	100	3.7	18	1.1	.39	72	1.0	.21	14	.2	R-7407
R-7408	2.0	21	50	5.7	15	1.9	.38	80	.6	.040	11	.1	R-7408
R-7409	1.0	16	50	3.6	7.9	.1	.22	37	.6	.010	9	.1	R-7409
R-7410	1.0	24	70	5.7	19	1.5	.42	70	.9	.030	13	.2	R-7410
R-7411	3.0	19	70	4.0	16	1.3	.34	47	.8	.040	12	.1	R-7411
R-7412	3.0	15	110	1.8	6.9	.2	.23	84	.5	.040	8	.1	R-7412
R-7515	33.0	11	170	15	9.5	1.2	.28	10	.3	.33	5	.2	R-7515
R-7516	1.0	11	100	3.7	30	3.8	.47	130	1.4	.23	5	.1	R-7516
R-7517	4.0	32	100	3.7	30	3.8	.47	130	1.4	.23	16	.2	R-7517
R-7518	4.0	19	200	2.3	15	.6	.29	20	.5	.48	10	.1	R-7518
R-7519	2.0	20	120	1.0	13	.4	.30	10	1.1	.27	12	.1	R-7519
R-7520	37.0	13	190	4.2	7.4	.5	.23	40	.3	.20	7	.1	R-7520
R-8165	2.5	37	270	2.1	19	.4	.47	160	1.1	.16	16	.1	R-8165
R-8166	12.3	20	290	8.2	15	1.3	.37	120	.8	.19	12	.1	R-8166
R-8207	9.9	20	340	5.6	20	2.0	.45	120	.6	.11	11	.1	R-8207
R-8208	5.4	20	570	4.1	17	2.1	.43	100	.7	.045	10	.1	R-8208
R-8209	7.2	11	530	2.5	6.8	.2	.19	60	.4	.073	6	.1	R-8209
R-8210	4.2	30	360	2.8	24	2.3	.53	140	.9	.20	18	.2	R-8210
R-8241	17.3	9.0	340	3.3	7.5	.5	.22	70	.5	.16	5	.1	R-8241
R-8243	63.2	13	160	2.8	13	1.5	.26	60	.7L	.15	7	.1	R-8243
R-8244	34.1	16	280	3.2	14	1.1	.28	80	.5	.26	9	.1	R-8244

TABLE 4C.--CONTENT OF 23 TRACE ELEMENTS IN 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA--CONTINUED

SAMPLE NUMBER	NA (PPM)	P (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SE (PPM)	SR (PPM)	TB (PPM)	TH (PPM)	U (PPM)	YB (PPM)	SAMPLE NUMBER
R-7324	250	35	16	0.80	3.0	6.0	1.0	0.1	1.5	0.60	0.6	R-7324
R-7325	200	22	30L	.70	2.2	1.6	1.2	.2	1.5	.30	.6	R-7325
R-7341	75	280	15	1.6	2.8	2.3	1.5	.2	1.7	1.3	.8	R-7341
R-7342	100	290	13	2.1	3.4	2.7	2.0	.3	2.1	1.9	1.0	R-7342
R-7343	220	35	39	.40	4.2	3.3	1.8	.3	2.9	1.1	.9	R-7343
R-7344	78	4L	20L	.30	1.4	3.6	1.0	.2	1.3	.80	.5	R-7344
R-7345	100	22L	22	.30	2.5	2.6	1.3	.2	1.8	.50	.6	R-7345
R-7346	97	300	20L	.60	3.3	2.8	1.3	.2	3.5	1.3	.2	R-7346
R-7347	200	26	23	.50	3.5	7.5	1.4	.2	2.3	1.0	.7	R-7347
R-7349	240	83	29	1.3	3.9	1.7	2.0	.3	2.7	1.9	.9	R-7349
R-7350	300	26L	24	2.0	5.8	1.3	2.1	.4	2.7	1.8	1.7	R-7350
R-7354	120	270	9	1.0	2.2	1.7	1.0	.1	1.0	1.4	.5	R-7354
R-7355	160	200	9	.60	2.0	1.0	.90	.2	1.3	.50	.5	R-7355
R-7366	120	31	8	.50	3.0	3.0	1.7	.3	3.4	1.3	.8	R-7366
R-7367	160	48	20L	.50	2.4	3.5	1.7	.3	2.5	1.1	.7	R-7367
R-7406	350	360	21	.50	4.6	1.4	2.1	.3	4.6	1.7	.3	R-7406
R-7407	380	400	19	.70	4.1	1.5	1.9	.3	3.9	1.5	.9	R-7407
R-7408	340	22L	34	.60	3.7	4.8	1.9	.3	3.4	2.2	.8	R-7408
R-7409	220	22L	20L	.20	1.8	1.8	1.3	.2	2.3	1.0	.7	R-7409
R-7410	200	140	17	.50	4.0	1.0	2.1	.3	3.6	1.2	1.0	R-7410
R-7411	220	200	10	.60	3.8	.7	1.7	.3	3.6	1.7	.9	R-7411
R-7412	71	310	20L	.30	1.6	3.1	1.4	.2	2.1	.90	.6	R-7412
R-7515	170	44L	20	1.5	3.7	5.6	1.3	.2	1.6	1.4	1.3	R-7515
R-7516	250	44L	40L	.40	1.5	2.9	1.0	.1	1.0	.60	.4	R-7516
R-7517	320	39L	61	.80	5.7	4.8	2.3	.3	4.4	1.2	1.2	R-7517
R-7518	330	44L	20	.50	2.8	4.7	1.6	.2	2.8	1.4	.6	R-7518
R-7519	680	44L	50L	.20	2.8	3.1	1.7	.2	3.4	.30	.8	R-7519
R-7520	290	44L	40L	.50	2.1	1.7	1.2	.2	1.5	.50	.6	R-7520
R-8165	230	1,000	40L	.80	5.0	2.9	2.2	.3	3.9	2.2	1.0	R-8165
R-8166	390	44L	40L	.70	4.0	3.9	1.6	.3	3.2	1.6	1.0	R-8166
R-8207	470	920	27	1.0L	4.6	5.7	1.7	.3	3.0	1.1	1.0	R-8207
R-8208	300	70	19	1.0L	3.4	4.6	1.6	.3	2.5	.97	.8	R-8208
R-8209	200	440	30L	.50L	1.8	3.1	.70	.1	1.5	.89	.4	R-8209
R-8210	560	48	31	1.5L	4.8	2.1	2.2	.4	4.4	1.7	1.1	R-8210
R-8241	310	44L	30L	1.0L	1.6	2.2	.80	.2	1.1	.32	.5	R-8241
R-8243	400	44L	15	2.0L	3.3	6.0	1.0	.2	2.1	1.4	.7	R-8243
R-8244	380	200	13	1.0L	3.0	2.9	1.2	.2	2.5	1.8	.6	R-8244

TABLE 5A.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 2 BITUMINOUS COAL SAMPLES FROM BUCHANAN COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS.

[VALUES IN PERCENT OR PARTS-PER-MILLION. 23 VALUES ARE FROM DIRECT DETERMINATIONS ON WHOLE-COAL; ALL OTHER VALUES CALCULATED FROM ANALYSES OF ASH. S MEANS ANALYSIS BY EMISSION SPECTOGRAPHY; L, LESS THAN THE VALUE SHOWN; N, NOT DETECTED; B, NOT DETERMINED.

SAMPLE NUMBER	SI (PERCENT)	AL (PERCENT)	CA (PERCENT)	MG (PERCENT)	NA (PERCENT)	K (PERCENT)	FE (PERCENT)	TI (PERCENT)	AG-S (PPM)	AS (PPM)	SAMPLE NUMBER
R-7383	7.3	3.6	0.14	0.12	0.040	0.40	0.57	0.32	0.026L	4.0	R-7383
R-7494	1.6	1.3	.048	.028	.043	.12	.18	.083	.021	1.0	R-7494

SAMPLE NUMBER	B-S (PPM)	BA-S (PPM)	BE-S (PPM)	CD (PPM)	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	CU (PPM)	SAMPLE NUMBER
R-7383	22	210	2	0.07	43	150	9.8	42	2.3	20	R-7383
R-7494	9.7	61	4	.04	18	1,100	5.3	14	1.0	19	R-7494

SAMPLE NUMBER	ER-S (PPM)	EU (PPM)	F (PPM)	GA-S (PPM)	GE-S (PPM)	HF (PPM)	HG (PPM)	LA (PPM)	LI (PPM)	LU (PPM)	SAMPLE NUMBER
R-7383	2.6L	0.55	120	12	0.79	2.4	0.020	25	180	0.3	R-7383
R-7494	.7	.31	70	3.6	1.4	.7	.19	5	16	.1	R-7494

SAMPLE NUMBER	MN (PPM)	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	P (PPM)	PB (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SAMPLE NUMBER
R-7383	13	1.1	8.7	13	19	440	16	28	0.70	8.5	R-7383
R-7494	3.9	.28	2.5	9.7	9.0	22L	6.1	16L	.80	2.8	R-7494

SAMPLE NUMBER	SE (PPM)	SM (PPM)	SN-S (PPM)	SR-S (PPM)	TA-S (PPM)	TB (PPM)	TH (PPM)	U (PPM)	V-S (PPM)	W-S (PPM)	SAMPLE NUMBER
R-7383	B	3.0	3.4	340	0.05L	0.50	9.0	2.8	40	0.11	R-7383
R-7494	3.1	1.5	.76	110	.01	.20	2.7	.70	15	.04	R-7494

SAMPLE NUMBER	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)
R-7383	7.7	1.6	9.0	42
R-7494	4.4	.6	1.9	16

TABLE 5B.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS.

[VALUES IN PERCENT OR PARTS-PER-MILLION. 23 VALUES ARE FROM DIRECT DETERMINATIONS ON WHOLE-COAL; ALL OTHER VALUES CALCULATED FROM ANALYSES OF ASH. S MEANS ANALYSIS BY EMISSION SPECTOGRAPHY; L, LESS THAN THE VALUE SHOWN; N, NOT DETECTED
B, NOT DETERMINED.]

SAMPLE NUMBER	SI (PERCENT)	AL (PERCENT)	CA (PERCENT)	MG (PERCENT)	NA (PERCENT)	K (PERCENT)	FE (PERCENT)	TI (PERCENT)	AG-S (PPM)	AS (PPM)	B-S (PPM)	BA-S (PPM)	BE-S (PPM)	BR (PPM)	CD (PPM)	SAMPLE NUMBER
R-7348	3.0	1.9	0.066	0.062	0.020	0.27	0.53	0.085	0.012	7.0	9.4	73	2	B	0.09	R-7348
R-7351	1.0	.75	.077	.015	.046	.037	.36	.073	.028	3.0	24	52	1	B	.05	R-7351
R-7356	3.8	1.9	.090	.062	.085	.21	.32	.18	.028	2.0	17	160	1	B	.07	R-7356
R-7357	.82	.60	.13	.041	.032	.097	.35	.038	.014	2.0	6.3	94	1	B	.04	R-7357
R-7358	2.8	1.8	.15	.072	.038	.25	.50	.079	.036	6.0	10	130	3	B	.08	R-7358
R-7359	2.2	1.2	.053	.051	.035	.10	.52	.099	.052	4.0	12	96	3	B	.10	R-7359
R-7380	.66	.51	.063	.016	.020	.051	.23	.032	.040	6.0	9.6	40	2	B	.10	R-7380
R-7381	1.9	1.3	.044	.022	.009	.11	.14	.050	.052	1.0	13	42	3	B	.06	R-7381
R-7382	2.9	2.2	.046	.069	.029	.42	.26	.075	.048	2.0	18	85	5	B	.15	R-7382
R-7465	1.4	.97	.049	.020	.010	.065	.95	.070	.034	17	8.8	95	2	B	.06	R-7465
R-7491	2.5	1.0	.055	.018	.018	.057	.63	.18	.035	6.0	13	52	3	B	.07	R-7491
R-7492	.62	.47	.048	.013	.026	.039	.70	.027	.026	13	7.4	37	2	B	.06	R-7492
R-7493	1.4	.90	.049	.032	.030	.14	.34	.056	.029	.10L	6.4	45	4	B	.06	R-7493
R-7545	1.4	.99	.11	.061	.042	.098	.36	.042	.013	2.0	14	110	1	B	.02	R-7545
R-7546	1.4	.98	.087	.044	.026	.16	.91	.048	.015	29	11	72	2	B	.07	R-7546
R-7547	1.0	.82	.074	.017	.008	.073	2.1	.048	.068	68	9.9	69	3	B	.17	R-7547
R-7548	3.1	2.2	.13	.12	.035	.49	.70	.11	.91	4.0	18	170	1	B	.08	R-7548
R-7549	2.0	1.3	.14	.11	.043	.30	.50	.074	.018	3.5	17	140	1	B	.05	R-7549
R-7550	1.7	.94	.22	.043	.006	.053	.46	.080	.021	8.0	9.2	55	1	B	.05	R-7550
R-7551	14	7.1	.12	.65	.082	2.3	2.5	.36	.054	36	82	460	4	B	.19	R-7551
R-7552	2.8	1.7	.17	.090	.042	.35	.82	.11	.037	6.0	17	150	1	B	.10	R-7552
R-7553	2.5	1.3	.24	.099	.046	.31	1.5	.093	.048	12	19	130	1	B	.06	R-7553
R-7554	3.1	2.0	.27	.13	.041	.37	1.1	.11	.058	6.0	26	160	1	B	.10	R-7554
R-7555	3.0	1.9	.12	.12	.041	.41	.91	.11	.053	16	20	160	1	B	.12	R-7555
R-7556	9.0	4.7	.52	.40	.094	1.3	1.7	.23	.036L	19	51	330	3	B	.21	R-7556
R-7557	.68	.50	.070	.016	.004	.057	2.4	.036	.054	110	13	53	2	B	.05	R-7557
R-7593	4.4	2.6	.28	.18	.037	.64	1.0	.14	.019	23	26	150	2	B	.11	R-7593
R-7594	6.8	3.4	.15	.26	.055	.89	1.3	.17	.026L	5.0	37	340	2	B	.11	R-7594
R-7595	1.6	.99	.28	.075	.050	.096	.44	.079	.023	5.0	19	110	1	B	.08	R-7595
R-7596	1.7	1.3	.17	.050	.010	.057	2.7	.045	.044	59	2.4	73	5	B	.03	R-7596
R-7597	1.4	.77	.22	.064	.038	.036	.42	.072	.013	4.0	15	120	1	B	.04	R-7597
R-7860	2.9	1.8	.073	.099	.050	.53	2.5	.087	.031	120	17	150	2	4.4	.09	R-7860
R-7861	5.2	3.2	.85	.11	.026	.40	.37	.24	.041	1.5	15	130	2	19	.03	R-7861
R-7862	8.0	2.5	.068	.13	.032	.49	.60	.38	.044	7.2	23	130	2	20	.02L	R-7862
R-7863	6.8	4.1	.31	.30	.091	.95	1.0	.19	.039	2.7	33	260	2	8.6	.07	R-7863
R-7864	7.8	4.3	.11	.16	.046	.80	.67	.39	.040	11	25	180	2	28	.09	R-7864
R-7865	7.8	4.3	.078	.35	.051	1.4	2.3	.20	.045	64	30	210	3	17	.03L	R-7865
R-7866	4.8	2.4	.11	.11	.056	.38	.39	.18	.019	1.5	21	150	2	5.6	.02	R-7866
R-8167	.59	.47	.077	.021	.017	.063	.29	.025	.019	5.6	7.4	59	1	B	.03	R-8167
R-8168	3.1	1.2	.044	.089	.027	.32	1.7	.047	.020	40	8.6	240	3	B	.09	R-8168
R-8169	3.4	2.0	0.064	0.063	0.054	0.36	0.28	0.12	0.022	2.8	23	120	1	B	0.04	R-8169
R-8170	4.4	2.4	.066	.10	.053	.58	.54	.14	.025	2.8	26	140	1	B	.06	R-8170
R-8206	1.0	.73	.073	.015	.015	.037	.19	.069	.023	1.5	9.5	72	2	7.6	.02	R-8206
R-8242	.98	.66	.065	.024	.037	.059	.50	.062	.022	9.1	11	72	1	3.0	.08	R-8242

TABLE 58.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	CU (PPM)	DY-S (PPM)	ER-S (PPM)	EU (PPM)	F (PPM)	GA-S (PPM)	GD-S (PPM)	GE-S (PPM)	HF (PPM)	HG (PPM)	SAMPLE NUMBER
R-7348	24	240	4.7	11	1.3	21	2.6L	1.2L	0.34	56	7.0	1.8L	0.59	1.0	0.070	R-7348
R-7351	16	280	2.7	8.8	.2	15	1.0L	.7	.26	48	2.5	.80	.14	.7	.030	R-7351
R-7356	32	420	4.7	24	1.0	20	3.1L	1.4L	.46	260	6.2	2.1L	.28L	1.6	.030	R-7356
R-7357	11	50L	6.5	7.4	.4	14	1.0L	.5L	.22	510	2.2	.68L	.27	.4	.010L	R-7357
R-7358	22	60	11	11	1.0	17	2.6L	1.2L	.34	210	6.6	1.8L	.36	1.7	.030	R-7358
R-7359	30	350	14	18	.3	31	1.9L	.9L	.53	560	4.2	1.3L	2.0	1.1	.12	R-7359
R-7380	12	430	6.0	7.0	.3	17	.7L	.5	.22	57	1.9	.66	2.2	.3	.010L	R-7380
R-7381	14	230	16	12	.5	23	2.4	1.0	.31	35	5.0	1.1L	3.6	.5	.010L	R-7381
R-7382	23	200	9.4	22	1.8	27	2.7L	1.9	.43	95	7.0	1.8L	9.4	.6	.020	R-7382
R-7465	19	200	17	12	.6	24	1.5L	.8	.29	60	2.7	2.7	1.5	.7	.17	R-7465
R-7491	23	350	8.0	15	.3	24	1.9L	1.5	.46	90	3.0	2.6	1.2	1.5	.20	R-7491
R-7492	11	650	13	6.0	.4	16	.8L	1.1	.25	50	1.7	1.2	1.8	.3	.11	R-7492
R-7493	11	360	4.7	9.1	.3	16	1.3L	1.2	.20	70	1.9	.87L	.87	.5	.10	R-7493
R-7545	15	130	4.1	6.2	.3	9.6	1.4L	1.3	.28	60	3.2	1.3	.26	.7	.080	R-7545
R-7546	14	190	5.8	10	1.0	17	1.6L	1.1	.36	60	3.3	1.2	.22	.4	.13	R-7546
R-7547	22	520	15	14	.3	17	1.7L	.8L	.43	70	6.0	1.1L	9.9	.4	.25	R-7547
R-7548	22	260	5.1	20	2.0	20	3.4	2.2	.45	180	6.2	2.9	.28L	.8	.35	R-7548
R-7549	18	100L	7.2	13	.9	18	2.0L	.9L	.37	70	4.1	1.4L	.28	.5	.16	R-7549
R-7550	18	720	4.5	12	.2	14	1.6L	.7L	.37	40	2.2	1.1	.36	.6	.070	R-7550
R-7551	70	100L	13	57	7.0	35	12L	5.4L	1.3	120	21	8.2L	1.1L	2.8	.14	R-7551
R-7552	17	100L	6.8	15	1.2	17	2.7L	1.2L	.42	40	6.3	1.8L	.49	.8	.050	R-7552
R-7553	15	100L	2.2	14	2.0	9.3	2.6L	1.2L	.26	30	4.9	1.8L	.48	.9	.060	R-7553
R-7554	17	100L	5.2	19	1.5	22	3.2L	1.5L	.34	10	5.5	3.8	.29L	.8	.050	R-7554
R-7555	18	200	3.3	14	1.7	20	2.9L	1.3L	.36	60	5.7	2.0L	.27	.7	.050	R-7555
R-7556	46	100L	11	40	5.4	28	8.0L	3.6L	.85	80	14	7.6	1.1	2.1	.050	R-7556
R-7557	5.0	100L	2.2	5.0	.2	8.7	1.5L	.7L	.13	10L	4.0	1.1	13	.3	.15	R-7557
R-7593	26	300	5.2	21	3.0	22	4.1L	1.9L	.51	60	6.8	3.7	.56	1.0	.070	R-7593
R-7594	37	100L	9.2	28	2.9	19	5.7L	2.6L	.65	70	11	4.7	.52	1.7	.090	R-7594
R-7595	12	210	2.9	9.8	.4	12	1.7L	.8L	.23	40	3.2	1.1L	.15	.6	.050	R-7595
R-7596	14	210	9.7	4.6	.2	9.1	2.4L	1.1L	.24	10	6.8	1.7L	.89	1.1	.18	R-7596
R-7597	11	240	1.5	7.3	.3	12	1.4L	.6L	.20	10	2.6	3.1	.26	.6	.070	R-7597
R-7860	16	290	3.2	14	2.6	11	3.4L	1.5L	.27	260	4.3	2.3L	.23L	.5	.37	R-7860
R-7861	49	490	17	47	1.4	26	4.7L	2.2L	.86	170	8.6	3.2L	.75	1.7	.12	R-7861
R-7862	47	480	5.5	31	2.2	27	5.4L	2.5L	.71	150	8.1	3.7L	.37L	3.1	.50	R-7862
R-7863	31	230	5.8	26	4.4	22	6.1L	2.3L	.59	260	9.4	4.1L	.41L	1.0	.37	R-7863
R-7864	45	530	6.9	43	3.0	29	6.3L	2.9L	.61	210	11	4.3L	1.0L	2.2	.41	R-7864
R-7865	43	350	8.7	33	4.5	26	7.1L	3.2L	.73	230	11	4.8L	1.8	1.2	.37	R-7865
R-7866	27	100L	4.8	22	2.6	14	3.8L	1.7L	.41	150	5.0	2.6L	.43	1.2	.18	R-7866
R-8167	7.0	510	4.6	5.3	.6	7.4	.7L	.3L	.18	100	1.0	.47L	.37	.2	.058	R-8167
R-8168	14	550	7.8	12	2.0	20	2.8L	1.3L	.35	90	3.3	1.9L	2.9	.4	.068	R-8168
R-8169	21	1,400	4.2	15	1.4	19	2.8L	1.3L	0.42	100	4.4	1.9L	1.5	0.9	0.14	R-8169
R-8170	27	1,200	4.7	19	1.8	18	3.6L	1.7L	.48	90	5.6	2.5L	1.4	1.1	.058	R-8170
R-8206	15	520	8.3	10	.2	14	1.0L	.5L	.26	30	2.3	.68L	2.7	.6	.10	R-8206
R-8242	12	170	4.9	11	.3	11	1.1L	.5L	.27	30	2.8	.72L	.48	.7L	.17	R-8242

TABLE 5B.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	LA (PPM)	LI (PPM)	LU (PPM)	MN (PPM)	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	P (PPM)	PB (PPM)	PD-S (PPM)	PR-S (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SAMPLE NUMBER
R-7348	13	32	0.2	31	1.8	3.9	12	11	26L	19	0.24L	8.0L	17	1.2	3.5	R-7348
R-7351	9	9.4	.1	3.8	1.3	2.3	8.0	6.6	26	4.1	.09L	3.2L	20L	.30	2.0	R-7351
R-7356	19	28	.2	9.0	1.3	4.2	17	12	140	10	.28L	9.6L	22	.40	4.8	R-7356
R-7357	6	6.3	.1	9.9	.86	.45	3.3	6.3	96	2.8	.09L	3.1L	20L	.40	1.9	R-7357
R-7358	11	22	.2	14	1.1	2.8	6.5	14	70	17	.24L	8.2L	17	.60	3.2	R-7358
R-7359	17	18	.2	2.6	.96	1.9	8.7	20	66	10	.17L	5.9L	30L	.80	5.5	R-7359
R-7380	6	5.6	.1	2.7	2.2	1.1	5.0	9.9	150	4.0	.03L	2.2L	10L	.70	1.9	R-7380
R-7381	7	17	.1	3.8	1.7	2.7	10	17	22L	12	.07L	5.0L	6	.90	3.3	R-7381
R-7382	11	35	.2	9.1	1.2	2.5	13	17	22L	12	.12L	8.2L	23	1.7	5.6	R-7382
R-7465	11	13	.1	4.4	2.2	3.1	12	22	22L	4.6	.07L	8.2	20L	1.1	2.3	R-7465
R-7491	12	12	.3	3.4	2.5	6.4	18	14	83	6.3	.09L	6.8	25L	.90	3.6	R-7491
R-7492	6	3.4	.1	6.7	1.3	.70	7.8	14	87	2.3	.04	4.4	25L	.70	1.6	R-7492
R-7493	3	8.7	.1L	5.7	1.3	1.4	6.4	8.1	22L	3.0	.06L	3.9L	2L	.90	2.0	R-7493
R-7545	8	13	.1	22	.90	2.4	9.0	9.6	44L	10	.06L	4.4L	50L	.40	1.9	R-7545
R-7546	7	7.0	.1	120	2.7	1.6	12	10	66	2.7	.07L	5.8	50L	.70	2.4	R-7546
R-7547	11	5.4	.2	7.0	3.1	1.4	14	21	370	4.6	.08L	5.2L	40L	1.8	3.7	R-7547
R-7548	13	29	.2	22	1.8	2.0	15	12	48	8.4	.14L	9.5L	45L	.60	4.2	R-7548
R-7549	10	12	.2	18	1.0	.83	2.9L	8.1	44L	5.2	.09L	6.3L	45L	.60	2.9	R-7549
R-7550	11	16	.1	22	1.5	2.6	8.5	11	31	4.4	.07L	4.8L	20L	.60	2.7	R-7550
R-7551	40	120	.4	120	.54L	8.2	22	38	22L	16	.54L	37L	120	1.7	13	R-7551
R-7552	11	23	.2	48	2.6	2.0	3.9L	14	4L	7.4	.12L	8.4L	20	1.2	4.1	R-7552
R-7553	9	18	.1	21	.60	2.5	3.8L	6.7	4L	3.1	.12L	8.1L	31	1.2	3.1	R-7553
R-7554	10	1	.1	29	1.3	2.8	4.6L	6.1	13	9.4	.15L	9.9L	27	2.9	3.6	R-7554
R-7555	11	29	.1	24	2.0	3.1	9.3	11	4L	7.7	.13L	9.0L	19	1.5	3.4	R-7555
R-7556	26	51	.3	120	1.1	8.0	12	31	31	13	.36L	25L	80	1.9	9.3	R-7556
R-7557	3	4.8	.1	11	1.4	1.4	2.7	6.7	4L	6.0	.07L	4.6L	20L	5.9	2.2	R-7557
R-7593	17	41	.2	50	1.1	3.1	5.9L	14	9L	8.1	.19L	13L	35	2.4	4.9	R-7593
R-7594	23	39	.2	84	1.6	5.2	16	24	44	9.7	.26L	18L	74	.60	6.7	R-7594
R-7595	8	16	.1	53	1.2	1.3	2.7	9.0	13	4.4	.08L	5.1L	30L	.80	2.1	R-7595
R-7596	8	32	.1	36	2.6	5.2	3.6	18	4L	17	.11L	9.9	20L	.60	1.6	R-7596
R-7597	8	9.6	.1	58	.83	1.2	2.0L	4.7	26	2.9	.06L	4.4L	20L	1.1	2.0	R-7597
R-7860	9	9.5	.1	18	1.1	1.0	5.5	7.2	48L	8.4	.15L	10L	20	.50L	3.2	R-7860
R-7861	26	26	.3	24	2.2	7.3	12	28	240	12	.22L	15L	50L	1.0L	7.0	R-7861
R-7862	27	25	.4	17	.37	6.1	22	12	44L	18	.25L	17L	22	3.2	6.3	R-7862
R-7863	17	28	.2	36	.28L	4.1	16	16	48L	22	.28L	19L	30	1.0L	5.8	R-7863
R-7864	27	37	.3	15	.57	9.2	19	13	110	15	.29L	20L	38	1.0	9.1	R-7864
R-7865	24	28	.3	42	1.3	4.8	22	22	1,700	19	.32L	22L	66	2.0	8.0	R-7865
R-7866	16	16	.2	7.9	.48	5.6	12	11	44L	8.6	.17L	12L	26	1.0	4.7	R-7866
R-8167	4	4.3	.1	5.3	1.3	1.1	3.4	5.0	44L	1.3	.03L	4.7L	35L	.80	1.4	R-8167
R-8168	8	11	.2	21	2.0	.66	4.0L	16	44L	3.3	.13L	8.5L	35L	1.8	3.9	R-8168
R-8169	13	53	0.1	7.7	0.86	3.0	9.8	9.8	120	6.8	0.13L	8.8L	50L	0.90	3.9	R-8169
R-8170	16	48	.2	16	.41	2.3	8.3	9.2	52	7.6	.17L	11L	60L	.80	5.1	R-8170
R-8206	9	9.5	.1	7.2	.50	2.3	3.4	20	790	4.0	.05L	3.6	25L	1.0L	2.5	R-8206
R-8242	7	7.2	.1	48	1.8	2.6	6.2	16	700	3.6	.05L	3.3L	40L	1.0L	2.4	R-8242

TABLE 58.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 44 BITUMINOUS COAL SAMPLES FROM DICKENSON COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	SE (PPM)	SM (PPM)	SN-S (PPM)	SR-S (PPM)	TA-S (PPM)	TB (PPM)	TH (PPM)	TL-S (PPM)	U (PPM)	V-S (PPM)	W-S (PPM)	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)	SAMPLE NUMBER
R-7348	4.2	2.1	1.8	68	0.06	0.30	7.9	0.35L	4.1	21	0.12	9.8	0.9	9.4	27	R-7348
R-7351	2.1	1.4	.19	150L	.01	.20	2.3	.14L	1.0	11	.02	6.1	.6	3.2	15	R-7351
R-7356	2.0L	2.6	1.1	160	.05	.40	5.0	.42L	1.6	25	.09	9.0	1.2	6.3	25	R-7356
R-7357	5.2	.90	.09L	180	.00	.20	1.5	.14L	.50	8.1	.04L	4.2	.6	2.8	4.1	R-7357
R-7358	2.6	2.3	.72	230	.05	.40	7.1	.36L	3.6	16	.11	8.9	1.2	13	13	R-7358
R-7359	7.4	2.7	.17L	130	.02	.40	4.1	.26L	1.8	21	.03	7.5	1.2	9.6	13	R-7359
R-7380	1.5	1.0	.23	110	.01	.20	1.2	.17L	.60	10	.01	4.6	.6	5.3	8.6	R-7380
R-7381	5.2	1.4	.74	58	.05	.30	2.3	.37L	1.7	24	.07	8.1	.8	8.9	21	R-7381
R-7382	4.2	2.2	1.2	52	.02	.40	4.0	.61L	3.1	41	.05	9.0	1.1	21	21	R-7382
R-7465	5.3	1.5	.14L	95	.01	.20	2.5	.34L	.80	12	.03	5.8	.7	12	25	R-7465
R-7491	2.5	2.3	1.2	130	.04	.40	3.6	.97	1.4	18	.07	11	1.6	6.0	46	R-7491
R-7492	1.3	1.3	.07	100	.01L	.20	1.0	.19L	.50	7.4	.01	5.9	.7	8.1	8.5	R-7492
R-7493	1.3	.10L	.12	70	.01	.20	1.6	.29L	.50	12	.03	3.7	.1L	4.5	8.7	R-7493
R-7545	3.4	1.5	.77	190	.02	.40	5.3	.32L	3.9	9.0	.03	5.4	.7	3.1	15	R-7545
R-7546	1.8	1.2	.15L	150	.01	.30	1.7	.37L	.90	15	.03	6.4	.7	10	13	R-7546
R-7547	1.9	1.9	H	220	.00	.60	1.7	.38L	.70	13	.02	6.8	1.2	14	14	R-7547
R-7548	3.0	2.1	.56	200	.04	.40	3.7	.70L	1.9	29	.06	6.3	1.0	17	15	R-7548
R-7549	5.6	1.8	.28	160	.02	.40	2.4	.46L	1.1	14	.04	2.9	1.0	5.2	9.2	R-7549
R-7550	2.4	1.4	.14	210	.02	.10	2.8	.36L	.60	13	.03	5.5	.8	7.8	22	R-7550
R-7551	1.7	5.5	1.1	180	.55	1.0	10	2.7L	4.0	87	.68	17	3.1	92	50	R-7551
R-7552	3.5	1.6	.62	200	.03	.40	3.1	.62L	1.3	21	.09	4.2	1.2	15	14	R-7552
R-7553	4.4	1.1	.24L	190	.03	.20	2.4	.60L	.90	12	.06	3.2	.8	9.8	14	R-7553
R-7554	2.8	1.5	.44	200	.05	.20	2.9	.73L	1.5	20	.12	3.0	.8	12	14	R-7554
R-7555	2.7	1.5	.27	190	.03	.30	2.9	.67L	1.9	28	.08	5.7	.8	21	24	R-7555
R-7556	3.2	3.8	1.1	230	.25	.80	7.6	1.8L	3.2	69	.40	14	2.1	62	65	R-7556
R-7557	7.0	.50	H	60	.01	.10	.80	.34L	.30	7.4	.02	2.9	.5	4.4	8.0	R-7557
R-7593	2.8	2.2	1.1	170	.06	.40	4.3	.93L	1.9	30	.13	5.7	1.3	20	18	R-7593
R-7594	3.2	2.8	1.0	310	.13	.60	5.6	1.3L	2.0	37	.21	7.6	1.7	26	26	R-7594
R-7595	2.1	1.1	.53	180	.02	.20	2.3	.38L	1.0	11	.03	2.9	.6	7.5	16	R-7595
R-7596	3.5	1.5	H	160	.08	.10L	7.5	.56L	4.3	7.7	.13	6.4	.8	5.9	24	R-7596
R-7597	1.7	1.0	.13L	140	.01	.20	2.0	.32L	.90	9.0	.04	2.4	.6	2.1	12	R-7597
R-7860	7.1	1.2	.23L	130	.03	.04	2.3	.70L	.89	18	.05	3.8	.6	13	15	R-7860
R-7861	5.1	3.4	2.6	260	.13	.90	7.4	.99L	3.0	39	.17	15	1.7	17	71	R-7861
R-7862	4.5	3.5	2.5	81	.22	.97	8.7	1.1L	2.9	34	.29	12	2.2	11	56	R-7862
R-7863	2.7	2.5	1.3	210	.10	.73	5.0	1.3L	2.8	50	.17	10	1.3	7.7	28	R-7863
R-7864	4.8	2.9	2.5	180	.25	.72	9.2	1.3L	3.0	49	.29	13	1.7	32	80	R-7864
R-7865	2.6	3.5	.48L	100	.14	.99	6.2	2.7	4.4	64	.35	14	1.8	17	48	R-7865
R-7866	2.0	1.9	1.1	210	.08	.54	4.3	.79L	1.6	29	.09	8.9	1.0	17	44	R-7866
R-8167	3.1	.60	.05L	120	.00	.13	.90	.14L	.46	6.2	.01	3.1	.5	1.6	10	R-8167
R-8168	1.8	1.2	.19L	70	.02	.28	2.2	.58L	2.3	21	.09	5.1	1.0	43	9.8	R-8168
R-8169	2.6	1.7	0.93	140	0.03	0.25	3.3	0.59L	1.4	21	0.08	5.8	0.9	4.5	21	R-8169
R-8170	2.5	1.6	.31	130	.08	.31	4.4	.76L	1.6	23	.08	5.4	1.0	7.4	17	R-8170
R-8206	3.0	1.1	.44	86	.01	.19	2.3	.21L	1.2	13	.02	3.7	.6	2.4	17	R-8206
R-8242	3.1	1.0	.07L	110	.01	.23	1.8	.22L	.84	12	.01	5.8	.6	8.6	19	R-8242

TABLE 5C.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS.

[VALUES IN PERCENT OR PARTS-PER-MILLION. 23 VALUES ARE FROM DIRECT DETERMINATIONS ON WHOLE-COAL; ALL OTHER VALUES CALCULATED FROM ANALYSES OF ASH. S MEANS ANALYSIS BY EMISSION SPECTOGRAPHY; L, LESS THAN THE VALUE SHOWN; N, NOT DETECTED; B, NOT DETERMINED.]

SAMPLE NUMBER	SI (PERCENT)	AL (PERCENT)	CA (PERCENT)	MG (PERCENT)	NA (PERCENT)	K (PERCENT)	FE (PERCENT)	TI (PERCENT)	AG-S (PPM)	AS (PPM)	B-S (PPM)	BA-S (PPM)	BE-S (PPM)	BR (PPM)	CD (PPM)	SAMPLE NUMBER
R-7324	1.3	.98	.10	.045	.025	.19	1.8	.045	.034	55	9.2	84	1	3.0	.07	R-7324
R-7325	1.4	0.90	0.18	0.070	0.020	0.12	0.66	0.055	0.041	7.9	11	84	2	8.1	0.08	R-7325
R-7341	1.4	.94	.071	.023	.007	.12	3.4	.059	.046	62	4.4	48	2	4.0	.13	R-7341
R-7342	1.7	1.2	.054	.045	.010	.20	3.8	.073	.053	95	4.8	54	2	4.3	.17	R-7342
R-7343	4.3	2.5	.051	.13	.022	.52	.54	.13	.026	3.3	16	110	1	1.7	.06	R-7343
R-7344	.46	.51	.084	.022	.008	.045	.42	.023	.023	8.0	15	63	1	1.2	.06	R-7344
R-7345	2.3	1.4	.057	.065	.010	.26	.44	.067	.020	4.0	18	67	1	1.4	.05	R-7345
R-7346	2.4	1.4	.24	.063	.010	.070	.67	.11	.015	8.0	16	60	1	81	.06	R-7346
R-7347	2.7	1.7	.042	.055	.020	.27	1.2	.11	.023	32	6.8	71	3	8.3	.09	R-7347
R-7349	3.8	1.9	.10	.12	.024	.37	.91	.095	.032	9.0	16	100	2	9.4	.09	R-7349
R-7350	3.0	1.6	.13	.082	.030	.40	.64	.084	.048	18	13	110	4	8.7	.15	R-7350
R-7354	1.1	.69	.065	.024	.012	.096	.28	.040	.026	4.0	7.2	36	1	12	.07	R-7354
R-7355	1.3	.76	.063	.024	.016	.11	.25	.056	.020	8.0	7.7	42	1	8.4	.08	R-7355
R-7366	1.9	1.4	.16	.033	.012	.097	.16	.070	.021	1.5	12	48	2	1.0	.07	R-7366
R-7367	1.8	1.3	.070	.048	.016	.10	.25	.072	.023	2.4	9.0	34	1	1.1	.10	R-7367
R-7406	4.0	2.1	.20	.081	.035	.25	.47	.16	.024	2.8	21	120	1	1.6	.07	R-7406
R-7407	3.4	1.7	.21	.066	.038	.21	.91	.14	.021	24	15	86	1	2.5	.07	R-7407
R-7408	2.8	1.9	.082	.10	.034	.44	.44	.078	.037	1.7	19	140	1	.5	.07	R-7408
R-7409	1.1	.64	.073	.024	.022	.031	.18	.071	.018	.90	15	58	1	.7	.05	R-7409
R-7410	2.6	1.4	.20	.055	.020	.19	.27	.10	.043	.90	18	83	2	.7	.08	R-7410
R-7411	2.2	1.6	.090	.042	.022	.16	.27	.11	.038	2.6	13	61	2	.9	.08	R-7411
R-7412	1.1	.85	.10	.024	.007	.058	.24	.047	.017	3.0	7.7	28	1	.9	.05	R-7412
R-7515	1.1	.91	.039	.036	.017	.18	.48	.034	.018	33	12	38	5	2.7	.13	R-7515
R-7516	1.2	.88	.048	.048	.025	.17	.26	.037	.014	1.1	15	58		3.2	.05	R-7516
R-7517	5.8	3.4	.097	.20	.032	.59	1.3	.19	.023L	3.7	25	160	1	3.4	.06	R-7517
R-7518	1.7	1.5	.047	.037	.034	.23	.26	.072	.026	4.4	21	94		1.5	.06	R-7518
R-7519	3.4	1.2	.075	.035	.068	.093	.26	.13	.012	2.0	31	120	1	1.6	.06	R-7519
R-7520	.93	.64	.061	.023	.029	.076	.28	.039	.016	37	14	67	1	2.4	.02	R-7520
R-8165	3.0	2.1	.25	.029	.021	.090	.30	.15	.020	2.5	17	77	2	1.3	.08	R-8165
R-8166	3.0	2.0	.043	.061	.039	.34	.68	.12	.046	12	22	95	2	1.1	.06	R-8166
R-8207	3.6	2.1	.044	.079	.047	.44	.58	.10	.036	9.9	23	130	3	9.0	.10	R-8207
R-8208	2.9	1.7	.086	.061	.030	.32	.39	.091	.011L	5.4	19	110	3	9.1	.03	R-8208
R-8209	1.0	.63	.12	.015	.020	.040	1.0	.051	.046	7.2	17	67	1	4.2	.06	R-8209
R-8210	4.6	2.8	.043	.12	.056	.62	.50	.13	.026	4.2	42	150	1	6.3	.06	R-8210
R-8241	1.3	.80	.035	.019	.031	.088	.31	.053	.030	17	8.8	43	1	3.0	.17	R-8241
R-8243	1.9	1.4	.046	.063	.040	.34	1.9	.057	.037	63	14	110	1	4.0L	.07	R-8243
R-8244	3.0	1.7	.061	.064	.038	.30	2.6	.084	.053	34	14	84	1	4.5	.05	R-8244

TABLE 5C.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	CE (PPM)	CL (PPM)	CO (PPM)	CR (PPM)	CS (PPM)	CU (PPM)	ER-S (PPM)	EU (PPM)	F (PPM))	GA-S (PPM)	GD-S (PPM)	GE-S (PPM)	HF (PPM)	HG (PPM)	LA (PPM)	SAMPLE NUMBER
R-7324	10	140	5.4	9.8	1.3	14	.8L	.22	76	3.9	1.3L	2.5	.4	.17	3	R-7324
R-7325	12	480	13	9.3	1.1	22	0.7L	0.25	45	3.2	1.4	0.37	0.5	0.029	2	R-7325
R-7341	15	260	9.4	11	.7	23	1.0L	.29	24	4.6	2.2	3.5	.5	.39	8	R-7341
R-7342	20	240	12	14	1.0	27	1.3L	.39	43	5.4	2.7	6.1	.6	.39	3	R-7342
R-7343	22	50L	3.4	20	2.6	13	1.6L	.38	120	6.2	2.4L	.24L	1.0	.020	12	R-7343
R-7344	11	150	4.0	6.2	.1	15	.7	.22	20L	2.8	.99	.72	.4	.10	1	R-7344
R-7345	16	110	4.5	12	1.3	10	.9L	.28	88	3.8	1.4	.15	.6	.034	8	R-7345
R-7346	21	1,700	4.1	14	.5	20	1.5	.31	48	4.9	1.5L	.37	1.0	.13	14	R-7346
R-7347	16	510	3.4	15	1.8	14	1.2L	.31	80	5.9	1.8L	.61	.8	.12	3	R-7347
R-7349	22	290	6.5	16	1.9	24	1.4L	.39	46	6.2	2.2	1.9	.8	.028	12	R-7349
R-7350	19	450	18	15	2.0	40	1.6	.47	84	8.1	2.1	1.4	.8	.077	10	R-7350
R-7354	9.0	180	7.0	8.7	.6	18	.5L	.18	220	2.6	.72L	1.3	.4	.080	2	R-7354
R-7355	11	80	7.7	8.7	.8	15	.6L	.20	350	2.4	.83L	.77	.5	.020	6	R-7355
R-7366	20	1,700	4.6	9.6	.3	16	.8L	.27	140	5.3	1.2L	1.0	.9	.070	11	R-7366
R-7367	20	370	10	10	.3	16	.8L	.30	48	4.0	1.1L	2.0	.7	.030	2	R-7367
R-7406	27	70	5.1	23	1.3	21	1.5L	.41	77	8.0	2.3L	.86	1.2	.062	17	R-7406
R-7407	24	100	3.7	18	1.1	18	1.4L	.39	72	6.9	2.1L	.62	1.0	.21	4	R-7407
R-7408	21	50	5.7	15	1.9	25	1.2L	.38	80	6.3	1.8L	.21	.6	.040	4	R-7408
R-7409	16	50	3.6	7.9	.1	13	.8	.22	37	1.9	.68L	.21	.6	.012	2	R-7409
R-7410	24	70	5.7	18	1.5	16	1.6	.42	70	5.4	1.5L	5.2	.9	.025	4	R-7410
R-7411	19	70	4.0	16	1.3	19	.9L	.34	47	5.7	1.4L	.56	.8	.043	4	R-7411
R-7412	15	110	1.8	6.9	.2	16	.8	.23	86	2.3	.77L	.40	.5	.040	2	R-7412
R-7515	11	170	15	9.5	1.2	18	.7	.28	10	3.6	.81L	1.2	.3	.33	5	R-7515
R-7516	11	180	4.4	6.1	.9	10	.5L	.20	10	1.7	.80L	.08L	.2	.10	5	R-7516
R-7517	32	100	3.7	30	3.8	14	2.3L	.47	130	6.8	3.4L	.34L	1.4	.23	16	R-7517
R-7518	19	200	2.3	15	.6	20	.8L	.29	20	3.4	1.2L	.12L	.5	.48	10	R-7518
R-7519	20	120	1.6	13	.4	15	1.1L	.30	10	2.9	2.8	.17L	1.1	.27	12	R-7519
R-7520	13	190	4.2	7.4	.5	10	.4L	.23	40	1.8	.63L	.39	.3	.20	7	R-7520
R-8165	37	270	2.1	19	.4	20	1.2L	.47	160	3.9	1.8L	1.0	1.1	.16	16	R-8165
R-8166	20	290	8.2	15	1.3	25	1.2L	.37	120	4.2	1.8L	.80	.8	.19	12	R-8166
R-8207	20	340	5.6	20	2.0	19	1.4L	.45	120	6.5	2.1L	1.5	.6	.11	11	R-8207
R-8208	20	570	4.1	17	2.1	9.8	1.1L	.43	100	5.6	1.7L	.44	.7	.045	10	R-8208
R-8209	11	530	2.5	6.8	.2	11	.6L	.19	60	2.8	.84L	.32	.4	.073	6	R-8209
R-8210	30	360	2.8	24	2.3	14	1.9	.53	140	8.6	2.6L	.74	.9	.20	18	R-8210
R-8241	7.0	340	3.3	7.5	.5	8.8	.5	.22	70	2.1	.78L	.14	.5	.16	5	R-8241
R-8243	13	160	2.8	13	1.5	13	1.0L	.26	60	5.0	1.9	5.9	.7L	.15	7	R-8243
R-8244	16	280	3.2	14	1.1	13	1.4L	.28	80	6.2	2.1L	3.3	.5	.26	9	R-8244

TABLE 5C.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	LI (PPM)	LU (PPM)	MN (PPM)	MO-S (PPM)	NB-S (PPM)	ND-S (PPM)	NI-S (PPM)	P (PPM)	PB (PPM)	PD-S (PPM)	PR-S (PPM)	RB (PPM)	SB (PPM)	SC (PPM)	SE (PPM)	SAMPLE NUMBER
R-7324	13	.1	15	1.8	1.0	5.5	7.6	35	2.4	.13L	7.3	16	.80	3.0	6.0	R-7324
R-7325	9.1	0.1	11	3.2	1.8	7.7	18	22	3.0	0.11L	5.2	30L	0.70	2.2	1.6	R-7325
R-7341	13	.1	12	4.4	1.9	8.0	17	280	3.1	.20L	6.7L	15	1.6	2.8	2.3	R-7341
R-7342	17	.2	12	4.3	2.3	10	21	290	5.0	.26L	8.8L	13	2.1	3.4	2.7	R-7342
R-7343	26	.1	19	1.2	3.4	16	9.3	35	6.6	.32L	11L	39	.40	4.2	3.3	R-7343
R-7344	7.5	.1	6.6	1.9	.60	5.1	9.9	4L	2.6	.06L	2.0L	20L	.50	1.4	3.6	R-7344
R-7345	18	.1	14	1.2	1.9	10	8.7	22L	3.3	.19L	6.3L	22	.30	2.5	2.6	R-7345
R-7346	49	.1	29	2.1	3.5	7.8	11	300	7.2	.21L	7.0L	20L	.60	3.3	2.8	R-7346
R-7347	22	.1	12	.43	2.7	9.6	6.9	26	5.7	.23L	8.0L	23	.50	3.5	7.5	R-7347
R-7349	23	.2	23	1.3	2.2	14	16	83	7.9	.29L	9.8L	29	1.3	3.9	1.7	R-7349
R-7350	16	.3	18	2.0	1.9	14	18	26L	8.9	.23L	8.0L	24	2.0	5.8	1.3	R-7350
R-7354	2.9	.1	3.8	1.3	.62	5.3	9.1	270	3.4	.07L	3.3L	9	1.0	2.2	1.7	R-7354
R-7355	6.6	.1	2.9	1.1	.83	4.3	7.7	200	2.8	.08L	3.7L	9	.60	2.0	1.0	R-7355
R-7366	23	.1	3.0	.38	1.8	5.6	12	31	8.3	.12L	5.6L	8	.50	3.0	3.0	R-7366
R-7367	17	.1	5.7	.19	1.2	7.2	17	48	7.0	.11L	5.1L	20L	.50	2.4	3.5	R-7367
R-7406	60	.2	13	.67	4.0	8.1	14	2,400	11	.15L	10L	21	.50	4.6	1.4	R-7406
R-7407	52	.2	18	1.5	3.0	4.4L	9.3	2,900	9.0	.14L	9.3L	19	.70	4.1	1.5	R-7407
R-7408	15	.1	20	1.9	1.8	11	12	170L	11	.12L	8.1L	34	.60	3.7	4.8	R-7408
R-7409	8.6	.1	3.2	.90	3.2	8.1	9.0	480L	4.2	.05L	3.1L	20L	.20	1.8	1.8	R-7409
R-7410	18	.2	19	1.0	3.9	12	11	1,400	8.1	.10L	6.9L	17	.50	4.0	1.0	R-7410
R-7411	37	.1	9.2	.45	3.1	10	9.0	2,100	9.1	.09L	6.3L	10	.60	3.8	.7	R-7411
R-7412	15	.1	3.6	.66	2.3	8.7	4.9	6,000	5.6	.05L	3.5L	20L	.30	1.6	3.1	R-7412
R-7515	5.4	.2	5.9	1.6	.48	3.5	11	44L	4.8	.05L	3.7L	20	1.5	3.7	5.6	R-7515
R-7516	5.2	.1	12	.95	.29	3.6	5.1	44L	2.5	.05L	3.6L	40L	.40	1.5	2.9	R-7516
R-7517	22	.2	440	1.2	4.3	12	10	39L	6.3	.23L	15L	61	.80	5.7	4.8	R-7517
R-7518	16	.1	2.9	1.6	.78	5.2	6.2	44L	5.9	.08L	5.3L	20	.50	2.8	4.7	R-7518
R-7519	15	.1	3.5	.62	3.1	12	6.8	44L	5.8	.11L	7.5L	50L	.20	2.8	3.1	R-7519
R-7520	5.9	.1	2.5	1.1	.80	3.6	5.5	44L	2.0	.04L	2.9L	40L	.50	2.1	1.7	R-7520
R-8165	55	.1	8.3	1.2	6.6	9.3	7.7	1,000	10	.12L	8.3L	40L	.80	5.0	2.9	R-8165
R-8166	23	.1	7.5	.54	3.2	14	12	44L	7.7	.12L	8.4L	40L	.70	4.0	3.9	R-8166
R-8207	21	.1	11	.48	3.7	11	12	920	8.0	.14L	9.4L	27	1.0L	4.6	5.7	R-8207
R-8208	13	.1	43	1.0	2.4	11	8.8	70	3.8	.11L	7.5L	19	1.0L	3.4	4.6	R-8208
R-8209	7.3	.1	6.7	.38L	1.1	4.2	7.8	440	3.0	.06L	5.3	30L	.50L	1.8	3.1	R-8209
R-8210	35	.2	17	.44	2.1	17	11	48	5.8	.18L	12L	31	1.5L	4.8	2.1	R-8210
R-8241	7.3	.1	2.0	2.2	2.5	6.8	7.8	44L	2.2	.05L	3.5L	30L	1.0L	1.6	2.2	R-8241
R-8243	13	.1	11	.42	.84	3.3	6.4	44L	3.9	.10L	7.0L	15	2.0L	3.3	6.0	R-8243
R-8244	30	.1	24	1.6	6.0	10	3.1L	200	4.3	11	.7L	13	1.0L	3.0	2.9	R-8244

TABLE 5C.--MAJOR, MINOR, AND TRACE ELEMENT COMPOSITION OF 37 BITUMINOUS COAL SAMPLES FROM WISE COUNTY, VIRGINIA REPORTED ON WHOLE-COAL BASIS--CONTINUED

SAMPLE NUMBER	SM (PPM)	SN-S (PPM)	SR-S (PPM)	TA (PPM)	TB (PPM)	TH (PPM)	TL-S (PPM)	U (PPM)	V-S (PPM)	W (PPM)	Y-S (PPM)	YB (PPM)	ZN (PPM)	ZR-S (PPM)	SAMPLE NUMBER
R-7324	1.0	.33	83	.10	.10	1.5	.27L	.63	9.2	.50	3.8	.6	8.4	6.7	R-7324
R-7325	1.2	0.11L	270	0.09	0.17	1.5	0.22L	0.77	18	0.40	7.7	0.6	28	18	R-7325
R-7341	1.5	.32	140	.14	.17	1.7	.32L	1.3	15	.40	8.2	.8	17	19	R-7341
R-7342	2.0	.19L	120	.17	.30	2.1	.41L	1.9	19	.55	8.9	1.0	25	18	R-7342
R-7343	1.8	1.2	74	.26	.30	2.9	.51L	1.1	29	.45	8.3	.9	15	30	R-7343
R-7344	1.0	.11	210	.06	.20	1.3	.10L	.77	15	.30	5.4	.5	3.9	5.7	R-7344
R-7345	1.3	.21	78	.16	.17	1.8	.30L	.46	20	.40	7.1	.6	7.9	18	R-7345
R-7346	1.3	.33	380	.25	.20	3.5	.33L	1.3	24	.70	10	.8	5.7	35	R-7346
R-7347	1.4	.18L	67	.21	.21	2.3	.37L	.95	19	.70	7.0	.7	5.4	26	R-7347
R-7349	2.0	.22L	140	.20	.27	2.7	.46L	1.9	33	.60	10	.9	14	20	R-7349
R-7350	2.1	.41	150	.20	.36	2.7	.37L	1.8	32	1.3	16	1.7	26	14	R-7350
R-7354	1.0	.07L	82	.20L	.13	1.0	.15L	1.4	12	.50	3.9	.5	9.6	4.5	R-7354
R-7355	.90	.08L	82	.14	.15	1.3	.18L	.54	9.4	1.3	3.8	.5	5.0	5.5	R-7355
R-7366	1.7	.72	91	.21	.27	3.4	.27L	1.3	14	.90L	7.1	.8	4.6	16	R-7366
R-7367	1.7	.26	69	.20	.25	2.5	.24L	1.1	12	.90L	5.6	.7	8.3	11	R-7367
R-7406	2.1	.66	240	.39	.31	4.6	.70L	1.7	26	B	5.7	.8	7.5	26	R-7406
R-7407	1.9	.55	220	.36	.33	3.9	.63L	1.5	22	B	4.0	.9	6.4	15	R-7407
R-7408	1.9	.49	150	.18	.25	3.4	.55L	2.2	25	B	6.1	.8	11	13	R-7408
R-7409	1.3	.26	140	.17	.15	2.3	.21L	.98	8.1	B	6.3	.7	3.4	25	R-7409
R-7410	2.1	.58	150	.22	.27	3.6	.54	1.2	25	B	11	1.0	20	35	R-7410
R-7411	1.7	.75	86	.25	.30	3.6	.42L	1.7	22	B	6.0	.9	8.4	19	R-7411
R-7412	1.4	.34	51	.14	.20	2.1	.23L	.88	9.2	B	7.1	.6	2.6	28	R-7412
R-7515	1.3	.17	40	.07	.24	1.6	2.8	1.4	11	1.4	3.8	1.3	3.9	2.6	R-7515
R-7516	1.0	.13	79	.06	.14	1.0	.24L	.60	8.0	.30	1.3	.4	3.3	2.5	R-7516
R-7517	2.3	.70	97	.37	.28	4.4	1.0L	1.2	29	.60	6.3	1.2	23	38	R-7517
R-7518	1.6	.38	100	.15	.23	2.8	.36L	1.4	16	.40	2.0	.6	4.7	5.7	R-7518
R-7519	1.7	1.2	160	.31	.21	3.4	.51L	.48	13	.80L	5.4	.8	3.3	24	R-7519
R-7520	1.2	.21	150	.11	.20	1.5	.19L	.46	8.0	.70L	3.1	.6	2.9	6.7	R-7520
R-8165	2.2	1.3	200	.41	.34	3.9	.56L	2.2	21	.60	9.2	1.0	3.7	50	R-8165
R-8166	1.6	.47	98	.23	.25	3.2	.57L	1.6	26	.40	8.2	1.0	11	30	R-8166
R-8207	1.7	.22	150	.22	.28	3.0	.63L	1.1	34	.90	6.5	1.0	11	25	R-8207
R-8208	1.6	.42	110	.23	.32	2.5	.51L	.87	23	.50	5.6	.8	7.3	23	R-8208
R-8209	.70	.08L	150	.12	.14	1.5	.26L	.89	10	.30	3.3	.4	5.4	11	R-8209
R-8210	2.2	.58	120	.33	.39	4.4	1.1	1.7	39	.40	7.4	1.1	16	19	R-8210
R-8241	.80	.22	68	.12	.23	1.1	1.8	.32	11	.70	5.2	.5	2.3	22	R-8241
R-8243	1.0	.15L	47	.15	.19	2.1	.47L	1.4	14	.50	2.5	.7	6.7	7.6	R-8243
R-8244	1.2	.21L	140	.18	.22	2.5	.65L	1.8	21	.70	2.7	.6	13	12	R-8244
F															

Table 6a--Statistical summation of proximate and ultimate analyses, heat of combustion, forms of sulfur, and ash-fusion temperature of samples in this report*.

Proximate and Ultimate Analyses (percent)	Observed range maximum	Observed range minimum	Arithmetic mean	Geometric mean
Moisture	1.30	8.90	2.81	2.66
Volitile matter	19.10	44.50	31.37	31.01
Fixed carbon	28.50	64.20	54.48	54.14
Ash	3.00	50.30	11.34	9.55
Hydrogen	3.00	6.30	5.10	5.08
Carbon	39.20	81.80	73.44	73.09
Nitrogen	0.40	1.80	1.45	1.43
Oxygen	4.80	12.30	7.50	7.39
Sulfur	0.50	4.50	1.16	0.99
Heat of combustion (Btu/lb.)	69.48	144.70	131.15	130.51
Forms of sulfur (percent)				
Sulfate	0.01	0.42	0.04	0.02
Pyritic	0.03	3.02	0.50	0.27
Organic	0.25	1.62	0.62	0.59
Ash-fusion temperature (°C)				
Initial deformation	19.00	29.10	24.18	24.05
Softening temperature	20.50	29.10	24.70	24.61
Fluid temperature	21.40	29.10	25.51	25.44
Free-swelling index	1.5	9.0	7.5	7.3

*As received.

Table 6b: Statistical summation of oxides from ash of coal samples in this report.*

Oxide	Observed range minimum	Observed range maximum	Arithmetic mean	Geometric mean
SiO_2	22.00	70.00	49.00	48.00
Al_2O_3	14.00	36.00	27.00	26.00
CaO	0.32	5.50	1.70	1.30
MgO	0.33	2.00	1.00	0.94
Na_2O	0.08	1.30	0.43	0.36
K_2O	0.62	5.20	2.60	2.30
Fe_2O_3	2.50	51.00	11.00	8.50
MnO	0.004	0.25	0.03	0.02
TiO_2	0.63	3.50	1.50	1.40
P_2O_5	0.02	4.00	0.58	0.26
SO_3	0.25	7.00	2.00	1.60

*All data is in percent.
Samples ashed at 515°C.

Table 6c.--Statistical summary of trace-element concentration of coal samples in this report.*

Element	Observed range Minimum	Observed range Maximum	Arithmetic mean	Geometric mean
Ag	0.01	0.91	0.04	0.03
As	1.00	123.00	16.00	7.30
B	2.40	82.00	17.00	15.00
Ba	28.00	462.00	109.00	92.00
Be	0.39	5.40	1.90	1.60
Br	0.14	8.00	2.10	1.10
Cd	0.02	0.21	0.08	0.07
Ce	5.00	70.00	21.00	19.00
Cl	50.00	1700.00	362.00	264.00
Co	1.50	18.00	6.50	5.50
Cr	4.60	57.00	16.00	14.00
Cs	0.10	7.00	1.40	0.90
Cu	7.40	40.00	18.00	17.00
Dy	2.40	3.40	2.90	2.90
Er	0.50	2.20	1.20	1.10
Eu	0.13	1.30	0.37	0.34
F	10.00	560.00	101.00	71.00
Ga	0.96	21.00	5.20	4.50
Gd	0.66	7.60	2.30	2.00
Ge	0.14	13.00	1.60	0.88
Hf	0.20	3.10	0.86	0.73
Hg	0.01	0.50	0.14	0.10
La	3.00	40.00	12.00	10.00
Li	2.90	177.00	24.00	17.00
Lu	0.05	0.40	0.15	0.13
Mn	2.00	443.00	26.00	13.00
Mo	0.23	4.40	1.40	1.20
Nb	0.32	9.20	2.90	2.20
Nd	2.70	22.00	9.80	8.60
Ni	4.70	38.00	12.00	11.00
Pb	1.30	22.00	7.40	6.0
Pd	0.04	11.00	5.70	0.65
Pr	3.60	9.90	6.30	6.00
Rb	6.00	115.00	28.00	23.00
Sb	0.20	5.90	1.00	0.81
Sc	1.40	13.00	3.70	3.30
Se	0.70	7.50	3.20	2.90
Sm	0.50	5.50	1.70	1.60
Sn	0.07	3.40	0.75	0.52
Sr	40.00	381.00	144.00	129.00
Ta	0.002	0.55	0.05	0.02
Tb	0.04	1.00	0.32	0.27
Th	0.80	10.00	3.30	2.80
Tl	0.51	2.80	1.60	1.40
U	0.30	4.40	1.60	1.30
V	6.20	87.00	22.00	18.00
W	0.009	0.68	0.09	0.06
Y	1.30	17.00	6.70	5.90
Yb	0.40	3.10	0.94	0.86
Zn	1.60	92.00	12.00	8.50
Zr	2.50	80.00	22.00	17.00

* All data are in parts-per-million and are reported on a whole-coal basis

Table 7a.--Comparison of proximate and ultimate analyses, heat of combustion, forms of sulfur and ash-fusion temperature between Appalachian samples (Zubovic, et.al., 1980) and Virginia samples (this report and Henderson, et.al., 1981 combined).*

	Geometric mean	
Proximate and Ultimate Analyses (percent)	Virginia	Appalachian
Moisture	2.70	2.50
Volitile matter	30.30	28.10
Fixed carbon	55.60	54.70
Ash	8.30	9.70
Hydrogen	5.10	4.90
Carbon	74.00	71.80
Nitrogen	1.40	1.30
Oxygen	7.30	7.10
Sulfur	1.00	1.40
Heat of Combustion (Btu/lb.)	132.07	127.30
Forms of Sulfur (percent)		
Sulfate	0.02	0.04
Pyritic	0.28	0.62
Orgonic	0.59	0.76
Ash-fusion Temperature (°C)		
Initial deformation	23.61	12.60
Softening temperature	24.32	13.00
Fluid temperature	25.11	13.60
Free-swelling Index	7.4	5.6

* As-received

Table 7b--Comparison of oxide content in ash between Appalachian samples (Zubovic, et.al., 1980) and Virginia samples (this report and Henderson, et.al., 1981 combined).*

Oxide	Geometric mean Virginia	Geometric mean Appalachian
SiO_2	45.00	43.00
Al_2O_3	24.00	24.00
CaO	1.70	1.40
MgO	0.92	0.68
Na_2O	0.47	0.34
K_2O	2.00	1.60
Fe_2O_3	9.60	11.00
MnO	0.02	0.02
TiO_2	1.30	1.10
P_2O_5	0.16	0.13
SO_3	2.20	1.70

*All samples were ashed at 515°C. Data in percent.

Table 7c.--Comparison of concentration of trace elements between Appalachian samples (Zubovic, et.al., 1980) and Virginia samples (this report and Henderson, et.al., 1981 combined).*

Element	Geometric mean Virginia	Geometric mean Appalachian
Ag	0.03	0.03
As	7.80	8.40
B	13.00	14.00
Ba	78.00	48.00
Be	1.70	1.90
Cd	0.06	0.07
Ce	16.00	16.00
Co	5.80	6.20
Cr	12.00	14.00
Cs	0.71	0.66
Cu	16.00	15.00
Eu	0.30	0.33
F	78.00	51.00
Ga	3.90	4.80
Ge	1.10	1.10
Hf	0.63	0.61
Hg	0.08	0.12
La	8.40	8.80
Li	13.00	15.00
Lu	0.13	0.15
Mn	14.00	14.00
Mo	1.30	1.50
Nb	1.60	1.40
Nd	7.70	4.20
Ni	9.90	12.00
Pb	4.90	7.00
Sb	0.76	0.73
Sc	2.90	3.30
Se	2.70	2.80
Sm	1.40	1.60
Sr	97.00	65.00
Td	0.26	0.26
U	1.30	1.30
V	15.00	16.00
Y	5.80	6.20
Yb	0.77	0.84
Zn	9.70	14.00
Zr	13.00	13.00

*All data are in parts-per-million and are reported on a whole-coal basis. All data in percent.

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